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THE UNIVERSITY OF ALBERTA

INDIGENOUS CERAMICS AND ECOLOGICAL DYNAMICS OF SOUTHWESTERN MANITOBA

500 B.C. - A.D. 1800

by

© E. LEIGH SYMS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
AND RESEARCH IN PARTIAL FULFILMENT OF THE
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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled Indigneous Ceramics and Ecological Dynamics of Southwestern Manitoba 500 B.C. - A.D. 1800

submitted by E. Leigh Syms

in partial fulfilment of the requirements for the degree of Doctor of Philosophy

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May 3, 1976.

This thesis is dedicated to

MR. CHRIS VICKERS

for his inspiration, help, and insights that provided the basis for my search for a new research paradigm to account for the cultural history, processes, and ceramic variability of Southwestern Manitoba.

ABSTRACT

In order to account for the variability that occurs in prehistoric ceramics of Southwestern Manitoba, a new research paradigm--the Co-Influence Sphere Model--is developed and applied to the archaeological record. The Co-Influence Sphere Model emphasis the co-existence, interaction, and territorial overlapping of groups during the prehistoric and early historic periods.

The model requires an evaluation of the seasonally fluctuating resource potential across the Plains, Aspen Parkland, and Boreal Forest, the mobility and multiple biome utilization of historic groups, and the interaction of historic groups through formalized trade networks, conflict, and sharing of similar resources. The earlier emphasis upon chronology and mutually exclusive home territories of historic groups is replaced by a more realistic and dynamic model of groups with core, secondary, and tertiary subsistence-settlement areas in which groups interact to varying degrees.

For Southwestern Manitoba, the earlier Chronological Model with one identifiable phase and one historic tribe is replaced by a complicated record of four complexes during the Middle Woodland Stage, nine complexes during the Late Woodland Stage, and possibly fifteen different ethnic groups during the protohistoric and early historic periods. Furthermore, there is a shift in interrelationships between territorially overlapping occupants from the Boreal Forest and Plains with the advent of the Late Woodland Stage that is accompanied by the development of horticultural villages, growth and fission of human populations, and symbiotic relationships between horticulturalists and hunters.

The utilization of the dynamic Co-Influence Sphere Model requires a shift away from defining complexes and seeking causal relationships or processes within the limits of a small research region. The environmental limitations, cultural history, and cultural processes of any region, and particularly a region like Southwestern Manitoba which partly straddles an ecotone, can be determined only by an exhaustive study of fluctuating resources, ethnohistory, archaeological history, and variation in subsistence-settlement patterns beyond the region. In order to apply the Co-Influence Sphere Model to Southwestern Manitoba, it is necessary to relate local data and developments to developments in the Boreal Forest, Upper Great Lakes, Upper Mississippi, and Northern Plains. The relationships are determined by assessing the regions and areas beyond the local research universe and then interrelating the available local data with general developments rather than attempting to discover processes on the basis of limited local data.

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CHAPTER I

THE ORIENTATION AND METHODOLOGY OF THE THESIS

Introduction

In the summer of 1970, a pioneer research project was initiated in Southwestern Manitoba. The region is located along the margin of the Northeastern Plains to the south and west and the Aspen Parkland Ecotone and the Boreal Forest to the east and north. The goals of the project were to ascertain the cultural history of the ceramic producing groups that occupied the region during the last 2,500 years, to account for the ceramic and cultural variability, and to generate predictive hypotheses about the processes of historic and prehistoric interactions between society and environment and between societies.

In order to formulate the hypotheses, a cultural ecological research orientation was developed to provide:

a) a new research paradigm--the use of the Co-Influence Sphere Model;

b) the relevant variables for interpreting the utilization of the region, e.g., mobility of populations, resource potential fluctuations, environmental change, trade, and impact of cultural changes in near-by areas;

c) an evaluation of the current archaeological data to assess its applicability for explication of the processes of ecological adaptation and social interaction.

In order to achieve these goals, it was necessary to determine the fluctuating resource potential on a seasonal and long-term basis, to present a number of ethnohistoric subsistence-settlement analogs, and to integrate the resource potential, subsistence-settlement, and archaeological data both within and beyond the research region. This thesis reports the attempt to carry out this project and its goals.

The Southwestern Manitoba Research Universe

The term Southwestern Manitoba has been used in the past to refer to several geographical areas of varying size. The Manitoba Soil Survey originally defined an area of eleven townships in the Southwestern corner of the province (Ellis and Shafer 1940). Tamplin defined a Southwestern Manitoba region incorporating the Rossburn-Virden Soils Survey which tripled the area previously covered by the term (Leonoff 1970: 35, 40-41; Tamplin n.d.). Reeves referred to Southwestern Manitoba without any specific boundaries; he apparently included all of the grasslands and part of the Aspen Parkland of southern Manitoba (Reeves 1970b: 153-174). Joyes (1969) included the Avery Site in the Pembina Channel near Rock Lake within Southwestern Manitoba although it lies within the south-central portion of the province.

The research universe, as defined here, is most similar to the Manitoba Soil Survey (Figure 6). It extends from the Saskatchewan border east to include range 18 and from the United States border north to include the south half of township 9. The northern boundary is extended to include Oak Lake and Pipestone Creek because these are related more closely to the Souris River drainage system than to the Assiniboine River drainage. Only the south half of township 9 is incorporated in order to exclude the Assiniboine River drainage.

Included within these 2,672 square miles are several major physiographic units:

the Souris River Basin, Turtle Mountain, Waskada Till Plain, Reston-Tilston Park, the Souris River Flood Plain and tributaries, and 2 major lakes (Chapter 2).

The region contains four major habitats: grasslands of the southern and western parts, forested uplands on Turtle Mountain, forested river valleys, and Aspen Parkland in the northern portion. Each of these habitats represents parts of much larger zones that extend beyond the region boundaries.

Background to the Problem

Previous research within the region has been minimal, has lacked research direction, and has been obscured by placing the limited data into a chronological framework designed for other regions of the province. Early efforts consisted primarily of mound excavations in the late Nineteenth and early Twentieth centuries (Bryce 1885; Thomas 1894: 35-37; Montgomery 1908; Nickerson 1913, 1914b; Capes 1963). With the exception of Nickerson's research, the mound research consisted of weekend pilfering or uncontrolled excavations with scrapers pulled by horses. The only other excavation conducted prior to the present research program was a test excavation at the Riverview Village Site (DhMg-10) conducted by Richard S. MacNeish during one week in 1953 (Jim Yeo and Ken Williams:[1] personal communication). The archaeological materials associated with the mounds and the few test pits by Nickerson lacked dates and systematic analysis.

Definition of the local ceramic variability is hampered by the tendency of previous investigators to lump materials indiscriminately, to present superficial analyses, and to relate the local ceramics to ceramics from elsewhere on the basis of the most tenuous similarities. Wintemberg (1942) was the first to consider relationships between ceramics from Southwestern Manitoba and other regions. He suggested that the ceramics from Southwestern Manitoba included both Woodland and Mandan foci. The Mandan pottery was defined on the basis of cord-impressed decoration. Griffin (who edited and presented the paper after Wintemberg's death) disagreed with the criterion of pressing individual cords into the clay as being a Mandan trait and preferred an hypothesis that all of the pottery was Woodland.

---

[1] Jim Yeo and Ken Williams are local, retired farmers who worked with MacNeish during his stay in and around the community of Melita.

Katherine Capes edited Nickerson's manuscript and identified "Mandan pottery" from the Elliot Village (Capes 1963: 144). The basis for the identification was apparently the curved pattern of cord impressions. However, the presence of this decorative theme, alone, was not sufficient evidence to assign the pottery to the Mandan Indians. This decorative motif has been found in ceramic complexes that have not been assigned to the Mandan, and other traits such as rim profile, tempering and surface texture are important considerations in identifying ceramics.

The mounds of Southwestern Manitoba were assigned to the Melita Focus which was related to the Manitoba Focus which was, in turn, equated with the Blackduck Focus of Minnesota (Capes 1963: 115; MacNeish 1954). MacNeish popularized Vickers' hypothesis that the mounds of southern Manitoba should be attributed to the Assiniboin (MacNeish 1954: 45-52; 1958: 64-67; 76-77). Capes (1963: 113-119) favoured an Assiniboin identification for the burial mounds.

The Manitoba Focus was one of a series of foci stacked chronologically, primarily on the basis of limited excavations in Southeastern Manitoba (MacNeish 1958). The chronology was formulated using data extracted from multi-component sites with collapsed stratigraphy. These sites were excavated in arbitrary 6-inch (15 cm) levels and the components were assigned temporal estimates on the bases of a limited number of radiocarbon dates from outside the province.

Thus, inadequate research, an absence of carbon-14 dates, and a tendency to compare materials primarily with Minnesota, left a confusing picture of what appeared to be uniformly late materials. Subsequent dates from the mounds with a range of A.D. 600-1500, further research in neighbouring regions, and the present research, required a complete reevaluation of the antiquity and variation among ceramic complexes.

Given the vast area of the research region, the limitations of time and money, and the paucity of background research and data, sampling decisions had to be made for surveying, collecting surface samples, and excavating. These limitations had to be taken into account throughout the analysis of the research results.

The research region was too large to cover completely, even in a simple random sample. Therefore, initial research emphasis was concentrated on a subregion, south of the town of Melita and, within that subregion, in and near the Souris River, the major riverine habitat and one of its tributaries, the Gainsborough Creek. This locality was chosen because it included the research universe established by Nickerson (1914b), it was known to contain a variety of archaeological sites and features, and it provided a variety of physiographic features. This locality is hereafter referred to as the Gainsborough-Souris Locality.

Survey and excavations were conducted in the Gainsborough-Souris Locality during the summer of 1970 and 1971. Further data were accumulated during 1972, 1973, and 1974. The survey consisted of systematically checking the landscape in and along the Souris River valley and Gainsborough Creek. This initial phase was oriented toward a riverine habitat and adjacent valley edges because of its known importance in terms of occupation sites and burial mounds. The small, narrow, V-shaped valley of the Gainsborough Creek provided a contrasting riverine environment to the broad Souris River which is the main drainage element in the research universe.

Excavations were conducted at the Snyder I, Snyder II, Snyder Dam, and Brockinton sites (Syms 1971, 1972, 1974a, 1974b, 1974e, n.d.b). A sample from the Feland Site (Syms n.d.a) was collected from a newly plowed field and treated as a single component because undisturbed portions of the field indicate that the occupation existed as one, thin stratum at a depth of 10 centimetres. Research is continuing as part of a long-term project to conduct further investigation in the Gainsborough-Souris Locality and to initiate research in other subregions. Nash (1972, 1973) conducted a stratified random sample survey of a portion of this locality in the summers of 1972 and 1973. His survey increased the number of known sites, but most of the site samples were non-diagnostic and an effort to obtain a random sample from one field, on which two concentrations of mounds were located, resulted in meaningless data; collectors had been picking up the diagnostic tools for over 50 years and Nash's sample consisted mainly of fire-cracked rock scattered throughout a field. Research has been initiated recently in the Oak Lake Locality which contains one of the two large lakes in Southwestern Manitoba (Syms 1974c; Loveridge 1974; Haug 1976).

Research in Southwestern Manitoba has revealed evidence of ceramic components unlike those previously reported for the Northeastern Plains (Syms 1972, 1974b, 1974c) in addition to some reported previously elsewhere on the Northeastern Plains but not in Manitoba. The ceramic record in Southwestern Manitoba is different from the other areas of Manitoba and is complex and highly variable. The known ceramic sites differ in size and composition; some consist of a thin scattering of debris confined to a few hundred square metres, others are larger and/or are associated with major features such as burial mounds and earth works (Capes 1963; Syms 1971; Nash 1972). Initial examination of a wide variety of ceramics from the collections and excavations indicated evidence of similar relationships between the ceramics of Southwestern Manitoba and ceramics from the Boreal Forest of the northern shield area, the Upper Great Lakes area, the Illinois Lowlands, the Eastern Plains, the Missouri River trench, and the Northwestern Plains.

Research and analysis are hampered by the paucity of previous archaeological efforts, the limitation of most previous archaeological research strategies primarily to establishing chronologies, the lack of awareness of the variety of ethnohistorical subsistence-settlement systems, and the failure to consider the impact on the movements and interaction of historic and prehistoric groups of the variable resource-potential across biomes. The archaeological record not only is much more complex than has been recognized previously, but it is clear that earlier conceptual models for Manitoba can not account for the variability observed.

The Problem

Archaeology, like all sciences, consists of a developing body of data, concepts, hypotheses, and theories. In regions where pioneer research is being conducted, an initial model or framework must be constructed for the existing body of data. However, there was no existing model that accounted for the ceramic variability in Southwestern Manitoba.

Prior to the development of the current research program, the existing model for Manitoba and the Western Canadian Plains and much of the Boreal Forest was the Chronological Model (MacNeish 1958; Forbis 1960; Wettlaufer and Mayer-Oakes 1960; Wormington and Forbis 1965; Kehoe 1967, 1973; Reeves 1970a; Wright 1971, 1972b; Byrne 1973). This model consists of a series of "cultures" stacked sequentially.

Within Manitoba, the Chronological Model was developed using data from a few test excavations, identifying certain normative types of artifacts as "index fossils", and placing clusters of artifacts into a series of foci or "cultures" (MacNeish 1954, 1958). There were no radiocarbon dates, so the foci were assigned temporal ranges on the basis of dates from other areas of the continent and on the basis of questionable correlations between flooding patterns on the Red River of Manitoba and the Missouri River of North Dakota.

The data from Manitoba and nearby areas of the Boreal Forest were extracted from sites with collapsed stratigraphy; i.e., multiple occupations were present but they lacked sterile layers between them and mixing had been increased by such post-depositional forces as rodents, roots and frost-heave action. These sites were often dug in arbitrary 6 inch (15 cm) levels and the changing frequencies of materials from these levels were treated as evolving cultural differences (MacNeish 1958; Wright 1968, 1971, 1972b). As the number of excavated sites in Manitoba increased, the temporal estimates for the foci over-lapped to allow for the co-existence of two foci but the significance of this over-lap was not considered (Mayer-Oakes 1970; Hlady 1970b). For the Boreal Forest, including eastern Manitoba, the sequences were interpreted as a uni-lineal evolutionary sequence of Cree cultural history (Wright 1971; 1972b).

The temporal estimates assigned to the various foci were based on a complete absence of dates for Manitoba and on relatively few dates elsewhere. The estimates generally included the complete time period in question which gave the impression that there was little or no temporal over-lap and that the complete archaeological record was known. The later impression, while obviously false because of the limited sample of excavated sites, was often accepted and subsequent materials were forced within the existing chronologies (Penny 1970; Trottier 1973; Jamieson 1974).

The protohistoric and early historic archaeological remains from these regional sequences were assigned to one ethnohistorical group per area; e.g., the Selkirk materials were assigned to the Cree and the Blackduck materials to the Assiniboin. For Manitoba, the Cree were identified as the occupants of the eastern and central part of the province and the Assiniboin were identified as the occupants of the southern and western part of the province (MacNeish 1954, 1958; Mayer-Oakes 1970; Wright 1971, 1972b).

The archaeological record of Southwestern Manitoba was lumped into a single focus of a sequence that had been developed in eastern Manitoba (MacNeish 1958; Cameron 1962; Ossenberg 1974). The regional data were based primarily upon undated materials from mound excavations.

There are several limitations to the Chronological Model as it has been developed and utilized in Manitoba and surrounding areas. It is a static model which identifies all or most cultural variability at any one time to one group; any variability that occurs in a class of artifacts such as ceramics must be attributed to the variability of a single group plus "foreign" elements that are diffused from other areas. It does not allow for mobility of groups on either a seasonal or long-term basis, co-existence of several groups in the same territory, or the formation of new groups by means of fissioning; e.g., the Assiniboin separating from the Yanktonai and becoming a distinct group. Since there is no recognition of mobility as an important factor in the utilization of a region, external influences must be explained as diffusion of ideas from group to group.

The chronological framework has, as an implicit or explicit assumption, the premise that variability is due to change through time. The chronological framework also bears an implicit or explicit assumption of in situ uni-lineal evolution. Both of these premises are contradicted by the available ethnohistoric information and by the inferences established for the prehistoric complexes by integrating the archaeological data and the ethnohistoric analogs.

Another serious limitation is the mixed context of the assemblages. Since all of the sites in Manitoba that were used to develop the chronology apparently had collapsed stratigraphy, it was impossible to define pure assemblages despite the data being presented as if the foci were unmixed (MacNeish 1958). Inasmuch as it was impossible to recognize pure assemblages, it was impossible to determine if groups were entering or leaving the various biomes. Researchers could not ascertain whether temporal differences were due to evolutionary change, mixing, the appearance of new groups, or the diffusion of ideas among groups.

Any inferences of the data were based almost solely upon local data; few comparative data from other areas were used. It was impossible to understand why groups existed in any region and why they utilized particular sites, with the exception of such obvious reasons as the advantages of being near a river.

The utilization of faunal remains from mixed contexts could only give examples of some of the resources that were being used and some of the seasons for certain species such as migratory waterfowl (MacNeish 1954, 1958; Lukens 1970). The data were not used to determine whether sites in a particular biome were seasonal camps or year-round occupations. It was impossible to account for the limitations or influences of the biophysical environment. Interpretations of resource utilization between sites produced evolutionary shifts in resource utilization through time but ignored the fact the sites were in different biomes (MacNeish 1958); therefore, geographical variability was treated as temporal variability.

Despite Walter W. Taylor's (1948) earlier appeal for archaeologists to investigate the influence of environmental variables on archaeological complexes and to view those complexes as the remains of past cultures rather than as tool chronologies, a move towards such orientations has begun only recently, and a processual or systemic school of thought is still in the developmental stage (Binford 1964, 1968b, 1968c, Longacre 1968; Deetz 1968a; Kushner 1970; Martin 1971; Struever 1971; Redman 1974). Struever (1971: 10) contrasts the processual approach to the older "normative" approach as follows:

> For the systemic theorist, culture is made up of parts, structurally different from each other, but articulated within the total system. More broadly, culture and its environments represent a number of articulated systems in which change occurs through a series of minor, linked variations in one or more of these systems. A major objective of archaeology is to understand

the linkages between parts in both the cultural and environmental systems as reflected in the archaeological data. The strategy of the "Process" or "systems" school of archaeology, says Flannery, "is therefore to isolate each system and study it as a separate variable" or complex of variables, with the ultimate goal being "reconstruction of the entire pattern of articulation . . . ." Contemporaneous cultural variation between regions in prehistory, therefore, might be expected to reflect differing adaptive requirements of specific environments; accordingly, varying ecological potentialities are linked to different exploitative economies, and the latter to differing integrative requirements, and therefore, to different forms of social structure.

In sum, the job of archaeology for the systemic theorist is to reconstruct historical sequences of cultural and environmental systems with focus on the linkages between variables involved in the structural modification of these systems through time. Comparisons of regional sequences will, hopefully, point up regular, repeated relationships between certain of these variables. Hypotheses that explain these relationships can thus be generated and tested in subsequent archaeological research.

This view also postulates that material remains have a systematic relationship to the total culture. The task of correlating the structure of material and behavioral elements of a cultural system is a major aim. The structure of material remains is expressed in the functional classes of artifacts, features and debris that occur archaeologically, and in their quantitative and spatial relationships. As social, economic, political, and religious behavior have a spatial dimension, so also do the artifacts and debris used in or created by the associated activities. We might speak, for example, of a geographic statement of a social system and seek to identify, archaeologically, the material remains that express it (cf. Longacre 1968). The archaeologist's job is description of this structure of material remains within each of a series of universes beginning on the lowest level with the site, and extending to the region and so on.

Even this perspective of the processual school shares certain limitations with the previous Chronological Model in that a comparison of contemporaneous variation between regional sequences is advocated and the steps of analysis start with the site and extend to the region. The implication of this processual orientation is that it is also chronological but shifts from the primary description of diagnostic "index fossils" to an integration of material remains and behaviour.

Shifting to a processual or systemic orientation provides no panacea for archaeological research because it does not provide a general model for all societies or all regions. It requires a more realistic perspective on human behaviour rather than on tools; also greater rigour is demanded for interpretations because hypotheses must be formulated and the remains from archaeological sites must be considered as parts of integrated systems of cultural behaviour activities interacting with the environment. Before these systems can be integrated, however, it is necessary to have an understanding of the biophysical environment, a series of ethnohistoric analogs as examples of integrated systems, and an awareness of the cultural variability that existed.

A perusal of the limited published data and local collections from Southwestern Manitoba provided evidence that the ceramic record was highly variable. Subsequent excavations substantiated this observation. This ceramic variability raised a number of questions.

1) Why was there so much ceramic variability?

> It was important to determine whether the variability represented the range of expression of one group during one period, evolutionary change within one group, or the presence of two or more groups during several time periods. It was soon apparent that more than two groups had co-existed during various periods.

2) Why was this region important to several groups during various periods?

> The former Chronological Model could provide neither the data nor the conceptual framework to formulate hypotheses and evaluate the data. It was necessary to turn to biophysical and ethnohistoric data to develop a perception that enabled one to ask meaningful questions. It was obvious that the answers could not be obtained only from within the region, and all subsequent questions and research were based on contrasts between the region and biomes or cultural areas beyond the region.

3) What advantages or disadvantages were there in the biophysical environment of the region compared to other regions or areas?

In order to determine the advantages and disadvantages, it was necessary to consider the resource potential of the region compared to other areas. Since some resources such as bison provided a high, concentrated potential but moved about from season to season, and other resources such as small fur-bearers provided a diffuse potential, it was necessary to consider seasonal changes of resources and relative potential of diffuse versus focal or concentrated resources within and beyond the region.

4) How did the ethnohistoric groups utilize the region?

The region was important to a number of groups, and it was important to know which groups had utilized the region and how they had utilized the region; e.g., during a particular time for a particular resource, as part of a regular seasonal subsistence round, as year-round occupants, or as occasional visitors. Once the groups were identified, then the importance of neighbouring areas as part of the yearly subsistence-settlement could be established. These latter areas could then provide further evidence on groups who occupied Southwestern Manitoba but had not been reported in the region.

On the basis of data on the resource potential and ethnohistoric groups, it was possible to develop a new model, the Co-Influence Sphere Model, which applied to the historic record and which could be applied as an analog for the prehistoric record.

5) How does the use of the Co-Influence Sphere Model change archaeological research?

The new model required a complete shift in interpretation of existing and new data. Research emphasis had to shift from the site and locality in the region as a focal point to an emphasis upon all areas outside of the region and secondarily to the data within the region. Previous analytical units in archaeology such as focus and phase were defined and developed using a regional emphasis, therefore, it was necessary to define a new set of units. New sets of problems on mobility, effects of population change outside the region upon local populations, and new research orientations were now required. The local data were viewed as fragments of the total record augmented by data from outside the region; the gaps in knowledge and future research needs became more important than creating the illusion of a complete, chronological record.

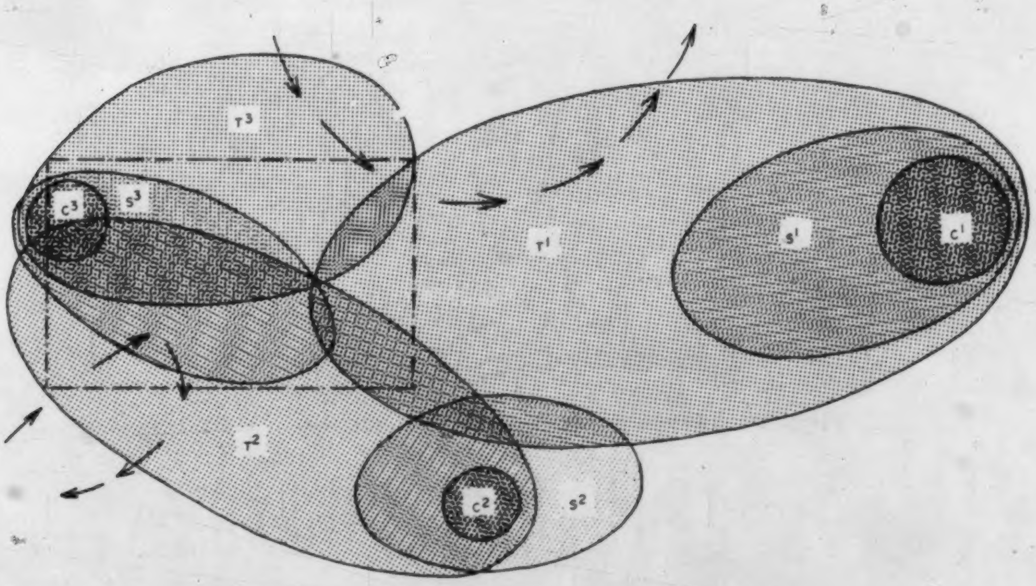
The Co-Influence Sphere Model

The ethnohistoric literature shows that numerous groups such as the Cree, Ojibwa, Bungi or Plains Ojibwa, Assiniboin, Teton, Gros Ventre, Mandan-Hidatsa, and Ottawa occupied southern Manitoba and exploited the physical environment in and/or near Southwestern Manitoba with a variety of exploitative emphases. Other groups such as the Cheyenne, Omaha-Ponca, and Crow may also have exploited the region. Some groups such as the Assiniboin used Southwestern Manitoba as part of their homeland, others utilized the region for seasonal bison hunts, and still others developed a trade network with local occupants.

In a research region such as Southwestern Manitoba where there is evidence for contemporaneous utilization by numerous ethnographic groups from a variety of near-by areas influencing one another either through positive interaction or a negative pattern of avoidance, the region can be analyzed most readily as a Co-Influence Sphere rather than as an isolated region with a unilinear chronology. The concept of the Co-Influence Sphere (Figure 1) emphasizes the importance of a constant consideration of more than one ethnic group at any season or year in a region. It also emphasizes the need to consider developments taking place outside of that specific region.

Figure 1 is a schematic representation of the model. Each Core represents the area in which an ethnic group traditionally spent most of the year or, minimally, habitually spent certain seasons of the year (e.g., the Santee Dakota occupied the Upper Mississippi Woodlands for fall, winter, and spring activities; the village Hidatsa occupied summer villages along the Missouri River). Secondary areas are those areas to which particular ethnic groups went on regular trips for a specific

THE CO-INFLUENCE SPHERE MODEL OF THE SOCIAL ENVIRONMENT FOR THE NORTHEASTERN PLAINS



C	Core or Home Area
S	Secondary Utilization
T	Tertiary Utilization
⬚	Boundary of Archaeological Research
⟶	Brief Intrusions

Figure 1. Schematic Presentation of the Co-Influence Sphere Model.

resource (e.g., Mandan groups left their villages along the Missouri River to trap eagles in the western Dakota badlands; Assiniboin groups left Southwestern Manitoba each fall to trade in the villages along the Missouri River). Regular utilization of these secondary areas was confined to a relatively brief period of the year, often by specialized groups such as hunting parties. Tertiary areas represent marginal areas that were utilized briefly and intermittently, but with sufficient frequency to provide evidence of repeated settlements or resource utilization or alteration; e.g., war parties, distant trading parties, or trips for specific resources such as raw materials. The periodic intrusions represent infrequent and sporadic visits such as sub-groups deciding to visit distant areas (e.g., the Iroquois and Crow visited York Factory on the Hudson Bay).

The Co-Influence Sphere Model is an extension of the Interaction Sphere Model used by Caldwell (1964), Struever (1964, 1965), and Struever and Houart (1972), as an interpretive concept for understanding the nature of Hopewell. The Hopewellian materials represent a number of regional traditions, each with its own unique set of traits such as ceramic decoration, burial techniques, site size, amount and kinds of exotic raw materials, and stylistic expressions of particular tools such as platform pipes, ear spools, mica sheets and clay figurines. The Hopewellian Interaction Sphere was viewed as an exchange of ceremonial or status items among interacting groups in which the status items served to maintain interregional ties (Caldwell 1964; Struever and Houart 1972). As such, the Interaction Sphere Model was proposed to account for interchange among groups who had achieved some degree of political centralization (possibly the chiefdom level of social organization), and had developed mechanism to maintain social stratification.

The Co-Influence Sphere Model emphasizes the importance of interaction and can be applied to any kind of interaction including formalized trading relationships, or simply temporary co-habitation among groups at any level of social organization. Both positive and negative interactions are important; the influence of the activities of one group by the presence or supposed presence of another (e.g., the Assiniboin altered their activities when they believed the Sioux were near), must be considered in interpreting subsistence-settlement systems. The interactions may influence specific groups during the utilization of only secondary or tertiary areas or may affect the entire yearly round of activities.

As the research emphasis shifts from chronology (MacNeish 1958; Mayer-Oakes 1970; Hlady 1970b; Jamieson 1974) to a Co-Influence Sphere Model, one arrives at a new gauge by which to measure the usefulness of the data, the limitations of currently available data, and the direction of continued research that is required in order to fill data blanks. The model indicates the obvious importance, for example, of settlement and analysis of utilized resources. Archaeologists are faced with the task of determining whether they can provide the necessary information to account for the previously mentioned variables.

Archaeologists are traditionally diachronically oriented. The use of the Co-Influence Sphere Model provides a new perspective for viewing settlement through time (Figure 2). The model is based on the premises that various

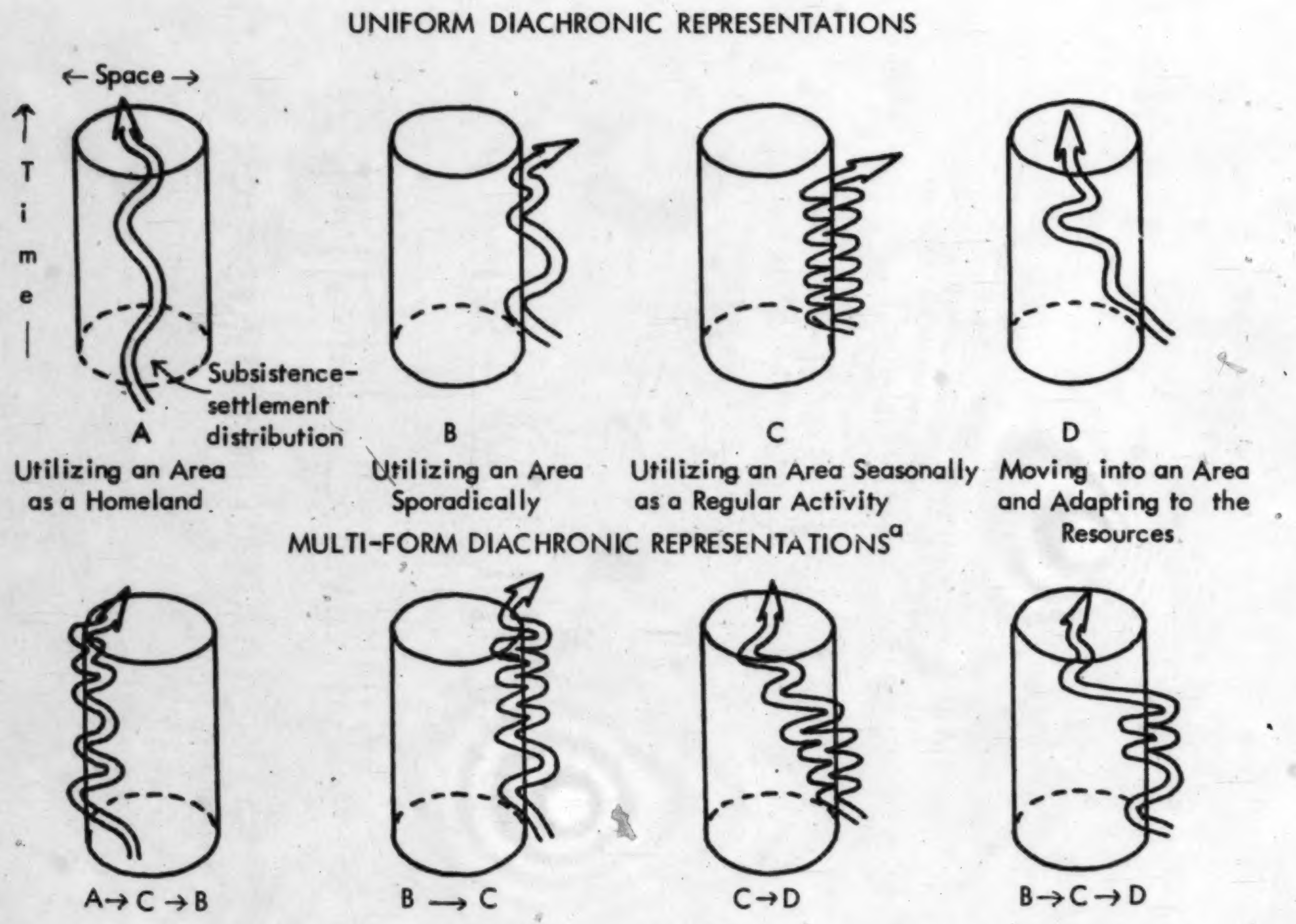

UNIFORM DIACHRONIC REPRESENTATIONS
← Space →
↑ Time —
Subsistence-settlement distribution
A
Utilizing an Area as a Homeland
B
Utilizing an Area Sporadically
C
Utilizing an Area Seasonally as a Regular Activity
D
Moving into an Area and Adapting to the Resources
MULTI-FORM DIACHRONIC REPRESENTATIONS[a]
A→ C → B
B ⟶ C
C→D
B→C→D

Figure 2. Schematic Presentation of Diachonic Mobility Patterns

[a] This represents four examples that one group might follow. Any one group may follow any combination of the Uniform Representations, and several groups may follow different combinations simultaneously.

ethnic groups utilized large areas in the past, shifted their distribution ranges, had the potential to be as mobile in the prehistoric period as in the pre-horse historic period, were capable of making environmental adjustments, and were capable of moving from region to region. Available ethnohistoric data show that many groups did move about. Oral histories recount that many groups such as the Santee Dakota, the Mandan, the Pawnee, and most of the Algonquian groups of the Western Great Lakes were formerly located in regions other than those in which they were first encountered and reported by Europeans. The archaeological record also shows that various prehistoric peoples moved about (e.g., the Mill Creek "culture" moved out of Iowa at the end of the Fourteenth Century A.D. [Anderson 1969: 141]).

There can be uniform seasonal,short-term, and long-term patterns of resource utilization by any group in a region. Groups can also change their adaptive strategies through time (e.g., a group utilizing a region sporadically and then shifting to a regular seasonal use or moving into the region as part of their homeland). Furthermore, the presence of several co-existing groups can result in several different subsistence-settlement orientations developing simultaneously.

The Co-Influence Sphere Model acts as a gauge of the reliability of the available data against the desired or required data to determine possible alternatives. The demand on archaeological data to provide evidence yielding information of the same complexity as ethnohistoric data, even on settlement and resource utilization, will enable us to determine whether archaeological research can currently achieve this step and, if not, what possible further developments are required.

Comparison of Existing and Proposed Conceptual Models

The Co-Influence Sphere Model requires several changes in the basic assumptions behind interpretations. The chronological, unilineal model has the following assumptions:

1. Differences in artifact assemblages within a region are due to temporal change.
2. Most or all archaeological units will not overlap temporally; any dates that conflict with the chronological sequence must be in error.
3. There has been little or no movement of groups from region to region; change is due to invention or diffusion of ideas.
4. Major archaeologicdl units such as complexes will have transitional forms; any "blending" of traits among local complexes is the result of evolutionary change through time.

The Co-Influence Sphere Model rejects these simplistic assumptions. Given the mobility and co-existence of groups, they must be modified as follows:

1. Differences in artifacts within a region may be due to changes induced over time, functional differences, or co-existence of two or more groups within a region.
2. Many archaeological units within a region may co-exist and overlap temporally.
3. Movement of groups from region to region is necessary for survival due to environmental variability and the maintenance of effective population densities. Change in tool kits may be due to invention, diffusion of

ideas during societal interchange, or the appearance of new groups.

4. Major archaeological units may have transitional forms if there have been long-term local developments. New groups will lack antecedents and transitional forms. Furthermore, blending of traits may be due to interaction of contemporaneous groups.

These new assumptions require a re-evaluation of all previous data. Many of the dates rejected previously by researchers because they did not fit into neat, chronological pigeon holes must be re-assessed. Much more rigorous temporal control is required. Manitoba archaeology has been stultified by reliance of researchers on MacNeish's estimates which lacked any radiocarbon samples (e.g., no article or monograph on Manitoba Blackduck materials has incorporated Blackduck dates from Minnesota although they have been available since 1964 [Johnson 1964; Streiff 1972] nor the numerous dates from western Ontario [Wright 1965, 1967a, 1967b, 1968a; Dawson 1974a]). Therefore, all available dates for the various archaeological units have been collected and tabulated here (Chapters 5, 6).

Also, the nature of possible transitional manifestations is crucial for differentiating between the processes of evolutionary change versus "synchronic" blending. When evolutionary change takes place, sites containing predominantly transitional tool kits may appear. Evidence of transition will be present in a variety of tool categories such as ceramics and projectile points.

When change is due to contact of co-existing groups, large numbers of "hybrid" forms, i.e., artifacts with a mixture of traits of the two groups, need not appear. Furthermore, this blending may take place with some tool categories while other categories will remain unchanged.

Research Strategy

The archaeological record represents expressions of the material remains and activities of groups interacting with their physical and social environments. However, if one is to use a Co-Influence Sphere Model, it is important to consider both a seasonal and long-term fluctuation in the resource potential, the limits of the biophysical environment as perceived by groups using the environment, the record of utilization, and the limitations to the archaeological record imposed by post-depositional forces (Figure 3).

The resource potential refers to the available resources that are economically significant for subsistence. These are the strategic resources such as the large mammals that influence and delimit the activities of various groups and the marginal or "catastrophic" resources that are utilized in conjunction with the strategic resources. The resource potential for a particular region must be determined on a seasonal basis and must be compared with the resource potential of other areas (e.g., when the bison herds left Southwestern Manitoba during the spring to graze on the Prairie to the west, the resource potential of the region changed dramatically in relation to the Grasslands).

Since societies do not expoit all resources and have biases toward particular resources which create a cultural "filter", it is important to identify these cultural values and their impact upon resource exploitation and settlement distributions. In order to assess the validity of interpretations of particular prehistoric groups, it is necessary to derive a series of subsistence-settlement system patterns from the ethnohistoric literature, to consider the validity and

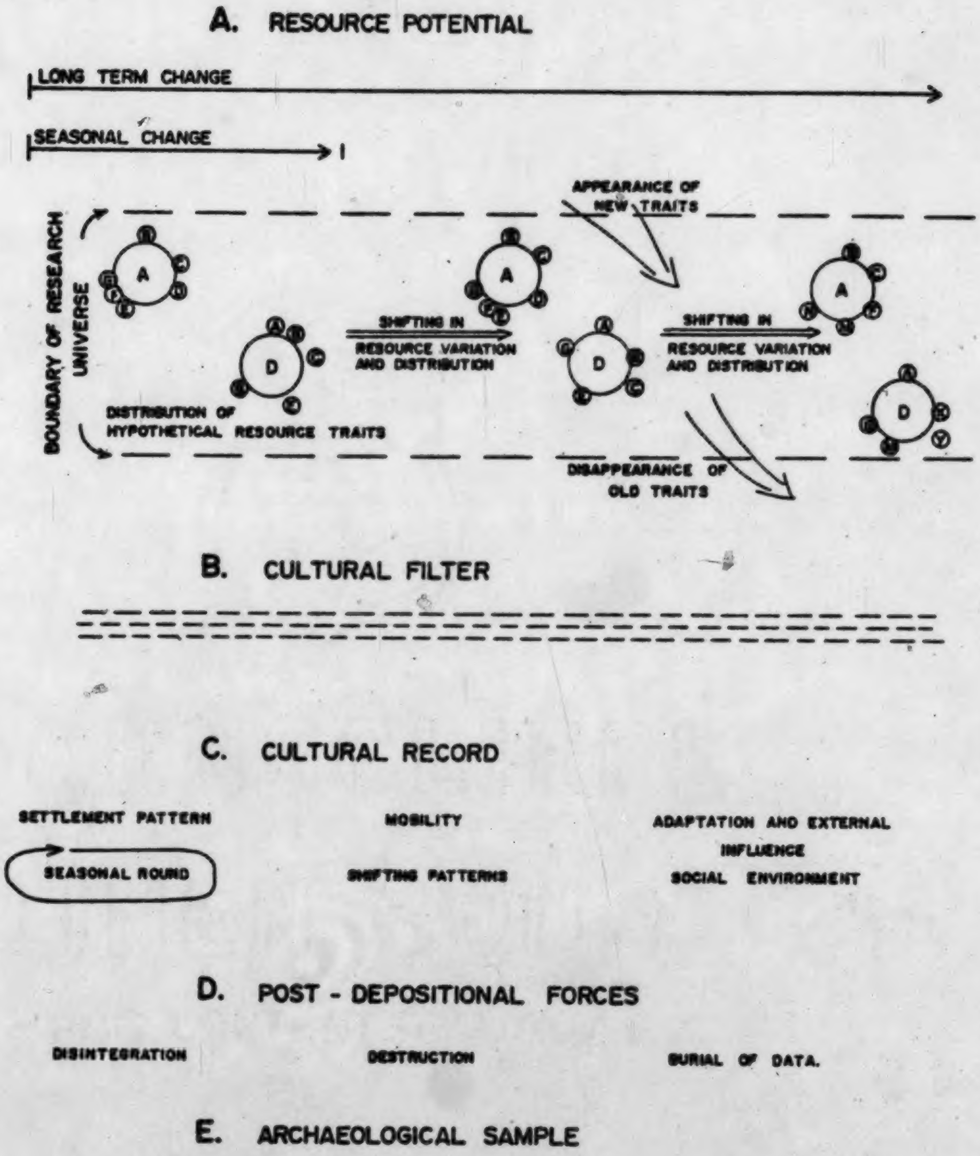

A. RESOURCE POTENTIAL
LONG TERM CHANGE
SEASONAL CHANGE
APPEARANCE OF NEW TRAITS
BOUNDARY OF RESEARCH UNIVERSE
A
D
SHIFTING IN RESOURCE VARIATION AND DISTRIBUTION
SHIFTING IN RESOURCE VARIATION AND DISTRIBUTION
DISTRIBUTION OF HYPOTHETICAL RESOURCE TRAITS
DISAPPEARANCE OF OLD TRAITS
B. CULTURAL FILTER
C. CULTURAL RECORD
SETTLEMENT PATTERN
SEASONAL ROUND
MOBILITY
SHIFTING PATTERNS
ADAPTATION AND EXTERNAL INFLUENCE
SOCIAL ENVIRONMENT
D. POST - DEPOSITIONAL FORCES
DISINTEGRATION
DESTRUCTION
BURIAL OF DATA.
E. ARCHAEOLOGICAL SAMPLE

Figure 3. Schematic Diagram of Relationships Between the Variable Resource Potential and the Ultimate Archaeological Record.

and limitations of applying these analogs to the archaeological materials, and to assess the archaeological materials in the light of these analogs. The ethnohistoric literature provides ample evidence that numerous groups occupied Southwestern Manitoba according to a number of different subsistence-settlement systems which incorporated seasonal rounds (Chapter 3). However, since no ethnohistoric group utilized the research region exclusively in its seasonal round, it is necessary to understand the manner in which these groups occupied the adjacent areas and why Southwestern Manitoba was important in their annual cycle.

When the archaeological data are compared with the resource potential and the ethnohistoric analogs, discrepancies do occur. These discrepancies may be due to inadequate sampling, alternative exploitation cycles, or post-depositional factors. In regions where research is in a pioneer stage, some hypotheses must be presented as premises that are "testable in principle" (Krause 1972: 106) because the above variables can be neither assessed adequately nor the hypotheses proven without further research.

An Ecological Strategy

One of the fundamental assumptions of cultural ecology is that mankind is part of an ecosystem and is therefore limited by the enviroment or his abilities to alter it (Vayda and Rappaport 1968: 492-497; Shay 1971: 3-4; Fitzhugh 1972: 7). One approach has been to treat the environment and culture as two separate spheres, while assuming that environment limits but does not determine culture (Vayda 1965: 3). An alternative approach is to view environment and culture as a single interacting system, to select cultural, biological, and physical variables that are interrelated, and to analyze the operation of and change within the system (Vayda 1965: 3).

Southwestern Manitoba is characterized by both environmental and ethnohistoric variability. The biophysical variability during a short-term annual cycle is influenced by internal phytogeographical differentiation, resource fluctuation on a seasonal basis due to climatic change, and migration of resources across the boundary of the region.

In order to consider the environmental potential, it is necessary to look at the natural resources in terms of both geographical and temporal variability. For yearly periods, the seasonal variability is important; for longer periods, increasing sophistication in palynological research and interpretation, sedimentology, and a variety of studies in micro and macro flora and fauna are necessary to understand the intensive changes in small-scale regional or large areal variability.

To derive the changes in short-term seasonal natural resources requires a shift from trait-list accumulation of organic and inorganic resources to an intensive analysis of geographical and temporal variability. Lists of Plains animals must include the strategic animals on the High Plains as well as the animal resources around tree-lined prairie potholes, in the wooded river bottoms, and on the wooded slopes. Knowledge of the size, composition, and seasonal distribution of bison can aid in explaining variability in subsistence-settlement systems, whereas the fact that bison are present merely tantalizes. The shift in grazing patterns and distribution of moose is more important in this regard than the mere presence of moose. In regions within the water fowl flyways, the seasonal shift in abundance of water fowl may be very important. Thus, one is left with problems of developing a dynamic model of natural resource potential which accounts for geographic and seasonal variation for both short-term and long-term periods.

The resource potential within the region does not remain constant with respect to the resource potential of adjacent areas. Any region may be attractive to groups with a particular economic system only during certain seasons. Thus, the regional potential must be established before attempting to establish the potential of a site or its locality. In order to establish the regional potential, it is necessary to compare the regional potential against adjacent areas on a seasonal basis.

In order to derive any primary biophysical variables for understanding the exploitative variability identified from ethnohistoric and archaeological data, it is necessary to contrast the shifting resource potential in a region on a seasonal basis with the shifting resource potential beyond the region. The shifting potential of strategic animals beyond the boundaries of the region are also identified since all ethnohistoric groups who occupied the research universe and adjacent areas had the choice of choosing either Southwestern Manitoba or an alternative region with which they were equally familiar.

The resource potential of Southwestern Manitoba is contrasted with the Plains to the south and west and the Boreal Forest to the north and east. The resources are divided into organic (plant and animal) and inorganic classes. The organic resources are divided into potentially crucial or strategic and marginal categories.

The research region is a heterogeneous environment located on the edge of the Northeastern Grasslands and the Aspen Parkland. The region is divided into the following habitats: sheltered river valleys, grassland, forested upland, major lakes, sloughs and marshes, and the Aspen Parkland Ecotone. Each of these habitats has a different resource potential.

The Aspen Parkland is an ecotone between the Grasslands and Boreal Forest, and its presence within and adjacent to the research region requires special consideration. The concept of ecotone as used here is that of a broad intergradation between major continental communities or biomes (Knight 1965: 250-251; Bird 1961). The Aspen Parkland Ecotone is a mosaic of open grassland, clusters of deciduous trees, and clusters of deciduous-conifer mixtures. It is a zone of tremendous variability ranging from almost pure grassland along the Prairie edges through varying frequencies of grassland-forest mixtures to stands of almost solid forest along the Boreal Forest edges (Bird 1961). The variability is further complicated by the presence of marshes, lakes, streams, and uplands.

Ecotones are zones of high resource potential. They contain species from both adjoining biomes and species specific to the ecotone. The densities of the "edge species" (i.e., the species from the adjacent biomes) within the ecotone tend to be higher than for the neighbouring biomes (Knight 1965: 249-254). These ecotones must be treated as zones of important influence upon the cultural history of areas rather than as lines between environmental zones (Hickey 1973). An assessment of the resource potential of the Aspen Parkland Ecotone plus recent studies of ethnohistoric data (Ray 1974) indicate that the ecotone is important for understanding the cultural ecology of ethnohistoric groups.

Subsistence-Settlement Systems

Since the environment and social groups are considered parts of one interacting and interrelated system, then the important or relevant sub-systems must be identified. For archaeologists, "the most accessible and direct relationship between a culture and its environment is expressed in its technological and economic adaptations, and those cultural forms most closely related with these pursuits" (Fitzhugh 1972: 7).

Subsistence-settlement systems represent a series of seasonal exploitative activities followed by groups in an annual cycle (Fitzhugh 1972: 7-8; Shay 1971: 3-4). The annual cycle is represented by a series of functionally different sites of a group as a result of their exploitative activities within a given territory. In the present study only small scale pre-industrial societies at the band and tribal levels of social organization are involved. In such societies, there is a versatile social organization in which the same institutions handle economic, political, and religious activities rather than having separate institutions for each (Sahlins 1968: viii). The emphasis of research is, therefore, upon the subsistence-settlement sub-systems.

The physical sub-systems with which the subsistence-settlement sub-system are integrated are climate, flora, fauna, raw resources, and other social groups. The latter have important positive influences through trade, and negative influences through conflict.

In order to determine what exploitative activities were practised by historic groups, the identity of all groups who used or may have used, Southwestern Manitoba had to be determined. Previous chronological models often identified only one group for a region on the basis of limited research from local fur-trade journals (e.g., the Assiniboin were identified as the sole occupants of Southwestern Manitoba [MacNeish 1954, 1958]). However, it is necessary to include historic accounts and oral traditions of groups beyond the region in order to determine how many groups occupied the region.

Once the identity of all groups is established, then it is important to construct a seasonal cycle of exploitation for each group in which the major resources, the seasonal distribution, and the nature of the interaction are determined. It is important to establish the total area utilized by a group as part of the core, secondary, and tertiary zones. Differential use of these zones may involve changes in resources, social organization, and intensity of use.

The ethnohistoric subsistence-settlement systems provide a series of analogs to be applied to the archaeological data. These analogs are interrelated with the fluctuations in the biophysical resource potential to provide a base line for interpreting and evaluating the archaeological data.

The Use of Analogy in Archaeological Interpretation

Analogy is one of the most widely used tools in archaeological interpretation (Ascher 1961: 317). Chang (1967: 230) states that archaeological reconstruction _is_ analogy, that any information beyond the artifact _per se_ requires the presumption of knowledge of man and culture in the broadest sense, and that every archaeological reconstruction is based upon a number of presumptions and assumptions which may be rendered probable or even scientifically true through recourse to ethnological data.

Analogy, in the most general sense, involves analyzing and interpreting unobserved behaviour on the basis of observed behaviour which is believed to be relevant (Ascher 1961: 317). Analogs are utilized for several levels of human behaviour, from the interpretation of the function of an individual tool, to subsistence-settlement systems, social organization, or palaeopsychology.

Swartz (1967: 492-493) classified four levels of analogy in decreasing order of reliability:

a) direct association, e.g., red ocher adhering to the surface of a palette;
b) ethnographic data from the same area as the archaeological materials, or the Direct Historical Approach;
c) ethnographic analogs from societies with similar subsistence levels and habitats;
d) experimental analogy, e.g., inferring chipping techniques from experimental flint-knapping.

These four kinds of analogy should be viewed as complementary alternatives rather than as levels of reliability. The use of direct association is meaningless unless accompanied by ethnographic analogies from which the reseacher can determine that the material is red ocher, the stone is a palette, and red ocher was ground on palettes. The experimental analogy provides sets of data that may not be available ethnographically and may substantiate or refute hypotheses based upon ethnographic analogy.

Two readily discernible analytical levels are:

a) the particularistic, ethnographic analogy or direct historical approach in which local ethnographic examples are chosen to interpret behaviour for local Late Prehistoric sites;
b) general comparative analogy derived from repeated occurrences in many cultures (Ascher 1961: 318-322; Chang 1967: 229-230).

The former has its greatest use for the Late Prehistoric and Early Historic periods when the archaeological and ethnographic data represent the same societies. The latter form of analogy should restrict its examples to societies which manipulate similar biophysical environments such as the Plains or Plains-Aspen Parkland transition, societies which have comparable levels of social organization (e.g., tribal groups), and similar subsistence-settlement patterns (e.g.,nomadic hunters).

The importance of maintaining these similarities varies with the analytical level. The hypothesis that women produced the utilitarian pottery in tribal societies requires greater rigour in the selection of societies of comparable social organization and technological development than the selection for comparable environments. An hypothesis regarding the function of a particular site or its seasonal utilization requires greater rigour in the selection of biophysical and subsistence analogs.

Modern or traditional ethnographic data can not be used for all analogs of even recent archaeological materials. For a sample of archaeological artifacts from the American Southwest, Hopi informants were unable to identify the function of many artifacts and guessed at the function of others (Anderson 1969: 135-138). One enigmatic tool found in Plains sites that has defied interpretation is a spatulate-shaped bone artifact identified as a quill flattener, pottery decorator, or hide smoother (Wheeler 1956; Lehmer 1971: 88-89; Butler 1975: 55-58).

Thompson (1956: 331) argues that the final judgment of an interpretation depends upon appraisal of the intellectual honesty of the particular archaeologist. If, however, the researcher presents the observations upon which the initial indicative quality of the analogy is developed and then states the hypotheses and evidence for the hypotheses upon which the inference was tested, this "faith orientation" can be eliminated. In fact, if the hypotheses and assumptions upon which various inferences are made are not stated, the results and the research should be viewed with caution.

Binford (1967a, 1967b) has argued that analogy must expand beyond the mere demonstration of formal similarities between entities. Using the example of small pits which he interpreted as smudge pits, Binford presented a rigorous example of ethnographic analogy in which his procedure was to:

> (1) provide a summary of the formal characteristics of this class of cultural feature; (2) document and evaluate the analogy which is demonstrable between this class of feature and certain facilities described ethnographically; (3) offer a postulate as to the function of the archaeological features; (4) develop certain deductively drawn hypotheses that could be investigated to test the probability of the postulates; and (5) cite the procedure employed (Binford 1967b: 3).

From the test applied to the features, he proposed the following steps which, due to their conciseness, are given verbatim:

> A. The Analogy
> (1) The recognition and demonstration of a positive formal analogy between a class of archaeologically observed phenomena and a class of ethnographically observed phenomena.
> (2) A consideration of the positive analogy between the spatial distribution of the facility as documented archaeologically and ethnographically, and the observation that, although poorly documented, the known distributions show a strong positive analogy.
> (3) A consideration of the degree to which it would be reasonable to expect a continuity between the archaeologically and ethnographically known cases; for example, the dating of the archaeologically known materials as reasonably viewed as cases of historical priority to the ethnographic data.
>
> B. The Postulate
> (1) The behavioral context of the use of the archaeologically known features was the same as that described ethnographically for the analogous facilities.

> C. The Developemnt of Testable Hypotheses in a Deductive Framework given the postulate offered
> (1) An examination of the ethnographic "context" of the activity for correlated formal characteristics which could be directly observed or studied archaeologically.
> (2) Given the postulate set forth in B (1) above and the knowledge of the formal, spatial, and temporal correlates of the activity designated in the postulate, the specification of a number of hypotheses as to the predicted mode of variation expected between the archaeologically observed analog and other archaeologically observable phenomena as specified by the studies of C (1) above.
> (3) The testing of the stated hypotheses and the refutation, refinement, or verification in probabilistic terms of the truth of the stated postulate.
>
> D. Finally this particular procedure should lead the investigator into the recognition of previously unrecognized relationships as suggest in C (1): the explanation of previously unexplained variation in archaeological data as the outcome of (C) and, as in the case of this particular example, the recognition of a generic class of phenomena definable by certain general formal characteristics where previously only a restricted class was recognized isolated by the common occurrence of specific formal similarities . . . (Binford 1967b: 9-10).

Much of Binford's (1968c: 270) orientation depends upon a deductive-nomological model in which a series of assumptions and prepositions are proposed for the expected relationship between two variables; e.g. ceramic variability and postmarital residence. He failed to recognize or credit the fact that all of the assumptions and prepositions are based upon ethnographic analogy. While his final postulate may not be derived directly from analogy, it is still only as strong as the analogies and their repetitiveness.

Some criticisms of the use of analogy have been less fruitful. Freeman (1968: 266-267) has criticized efforts to equate archaeological materials with corporate groups; his alternative is to assign regular clusters of associated artifacts to "activity parties" which may in the future be assigned to identity-conscious social groups. Other than adding jargon and rhetoric, this argument does little more than propose that there may be sub-groups within a corporate group, such as a tribe, that have specialized activities.

Analogy provides a series of alternatives which may be applied to archaeological data. The archaeological data plus the hypotheses and propostions derived from the analogies may be used to test other hypotheses. The analogies provide data to eliminate unlikely alternatives or provide a positive test for a correlation between variables (Ascher 1961; Binford 1968c; Anderson 1969).

The advantage of an ecological orientation lies in the ability to set up a series of limited alternatives from which analogs may be chosen. An understanding of the limits imposed by the biophysical evironment enable one to delimit the range of hypotheses that can be generated. The biophysical environment of Southwestern Manitoba precluded the development of horticultural activities that would produce adequate food surplus to support chiefdom or state levels of social organization, which in turn precludes activities such as demonstrating social stratification through elaborate burials and exotic burial items, supporting full-time craft specialists, or developing compartmentalized political organization.

The Co-Influence Sphere Model emphasizes the variability that may occur within the limits set by the biophysical environment. There may be a number of groups with different activities occupying the same region. For example, analogies concerning ceramic technology must consider the variation that can occur between potters with a sedentary background using more systematic manufacturing techniques, and nomadic potters who fulfill the minimal requirements to complete vessels. Also, different groups may utilize a region for different reasons (e.g., seasonal hunting of bison, seasonal hunting of diffuse woodland game, trading, or raiding).

Binford (1967a, 1968c) has argued that archaeological interpretation can and must advance beyond the level attained by utilizing traditional or modern ethnographic data. The danger in relying totally upon local modern analogs lies in not perceiving alternatives that may have developed as a result of a different resource potential or different expression of social interaction due to differing numbers, distributions, and behaviour of groups in the past. In fact, the Co-Influence Sphere Model incorporates a built-in assumption that change will have taken place through time.

The Archaeological Sample

The research sample for this study is confined to the prehistoric ceramic record because:

a) this criterion provides a convenient analytical boundary;
b) ceramic complexes have traditionally been considered more sensitive indicators of cultural boundaries and evolving changes than lithic tools such as projectile points;
c) the study is concerned primarily with subsistence-settlement data at the societal level involving activities of both sexes.

A study of all archaeological manifestations in Southwestern Manitoba from earliest Paleo-Indian complexes to the historic fur trade forts requires such massive amounts of data and comparative analysis that any effort to attempt such work in a single manuscript would be doomed to remain uncompleted for decades. The entire ceramic period is necessary, however, in order to provide a comparative framework. By looking at the evidence for Early, Middle, and Late Woodland and Plains ceramics, it is possible to observe changes and trends in distribution, adaptation, and cultural preferences within the Northeastern Plains and adjacent Northeastern Woodlands.

Pottery, because of its plasticity, is considered one of the most sensitive archaeological indicators of regional sequences and cultural change in Plains archaeology (Lehmer 1954b; Wood 1967; Johnston 1967; Calabrese 1972; Stoutamire 1973). The only lithic categories that have been useful for comparative analysis of contemporaneous periods are projectile point types but these appear to cross-cut different ceramic complexes (Lehmer 1954b; Wood 1967). Calabrese (1972, 1973) has been refining techniques to determine subtle differences within the form of late side-notched projectiles but these techniques have not yet become common comparative tools. Therefore, any comparison between local research materials and components or complexes in adjacent research regions must be confined primarily to ceramic comparisons.

The ceramic sample within Southwestern Manitoba varies from an isolated reconstructed Valley Focus vessel as a surface find (Syms 1971) to a stratified, multi-component excavated sample such as the Brockinton Site (Syms n.d.b, 1972). Some samples are found in good contextual provenience, others represent surface finds of single and multiple component sites. Ceramic samples from beyond the research region are incorporated in the analysis.

This study brings together data on a variety of ceramic complexes in environments ranging from Eastern Boreal Forests to Plains and from a time span of 500 B.C. to the historic period. Emphasis is placed on delineating major distributions of various ceramic complexes and the societies responsible for their manufacture and distribution. Sites that contain ceramics and a variety of lithic tools represent some social unit involving both sexes and some type of kinship unit of family size or larger. Late prehistoric non-ceramic sites may some day add useful data on settlement patterns and patterns of resource utilization (e.g., the hunters leaving camp to hunt game), but these sites will be useful only when lithic analysis is sufficiently sophisticated that non-ceramic lithic components can be correlated with specific ceramic components. Until such time, activity specific camp sites involving only males remain beyond the level of analysis attempted in this study.

Outline of the Dissertation

The dissertation is developed in a sequence of steps that is the normal order in which one should progress when utilizing the Co-Influence Sphere Model. Chapter 2 presents the data on the resource potential of the physical environment. Data on the geo-physiography, vegetation zones, faunal resources (e.g. mammals, birds, and fish), and non-organic resources are presented to show synchronic variability within the research region and beyond the research region. The resource potential is presented on a seasonal basis showing the fluctuations that occur due to climatic change and resource mobility, particularly for the bison and migratory water fowl. The faunal resources are divided into a number of categories based upon size and/or habitat preference. The resource potential within and beyond the research region is contrasted on a seasonal basis. Given the diachronic nature of the archaeological data, the available data on palaeo-environmental change within the region is also presented.

In Chapter 3, the ethnohistory of the region is reassessed to provide the basic data for the Co-Influence Sphere Model and the analogs for the archaeological data. The ethnohistoric record is shown to be a complicated account of numerous ethnic groups utilizing Southwestern Manitoba on a seasonal basis, of considerable mobility and movement as the groups shifted across biomes on a seasonal basis and/or migrated from area to area, and of groups interacting by means of symbiotic relationships between different subsistence adaptations (e.g. nomadic hunters and village horticulturalists exchanging produce), trade networks, and conflict. In order to determine which groups utilized Southwestern Manitoba and how they were affected by the local resources, it was necessary to be aware of ethnohistoric developments in the Boreal Forest, Upper Great Lakes, Upper Mississippian, Northeastern Plains and Northwestern Plains cultural areas. The unilineal, chronological model of few groups and little mobility was found to be untenable for understanding the social environment of Southwestern Manitoba.

Chapter 4 is a bridging section between the ethnohistoric and archaeological data. It provides an ethnohistoric perspective of Northern Plains potters which has implications for the choice of traits used by archaeologists for analyzing prehistoric ceramics. The various models and terminology used in previous efforts to understand the cultural developments in Southwestern Manitoba are reviewed and a new set of analytical concepts are proposed; these new concepts are more useful with the Co-Influence Sphere Model than the previous concepts that were developed for local chronological research.

The archaeological developments in areas affecting Southwestern Manitoba during the Early and Middle Woodland stages are presented in Chapter 5. The various complexes, configurations and horizons that are, or should be, found in Southwestern Manitoba are discussed. Factors such as population growth, population displacement, development of trade networks, development of new technological traits, and subsistence-settlement adaptations are identified.

Problems due to lack of data and previous analyses are discussed. A series of hypotheses and postulates are presented to account for the movement and adaptations of groups that affect the cultural developments in Southwestern Manitoba. The research emphasizes the information that can be learned about Southwestern Manitoba from outside the region.

Chapter 6 presents the analysis of Late Woodland developments in the Boreal Forest, Upper Great Lakes, Upper Mississippian, Central Plains, Northeastern Plains and Northwestern Plains cultural areas, and shows how these developments affected the archaeological record of Southwestern Manitoba. The Lake Woodland developments are contrasted with the Middle Woodland Stage to show how Southwestern Manitoba was utilized differently. During the Late Woodland Stage, more groups appeared in Southwestern Manitoba and symbiotic relationships developed between the nomads and horticulturalists.

The changes in the Northeastern Plains and Southwestern Manitoba are related to changes in subsistence (e.g., increased importance of horticulture), displacement of populations, and possibly climatic change. The variables that are important for determining processes such as population displacement versus evolutionary change are discussed. The inadequacies of a chronological, regional orientation are demonstrated.

Certain archaeological manifestations such as the Blackduck Horizon are presented in detail with their controversial alternative interpretations and are then re-assessed in light of new data and the Co-Influence Sphere Model. Emphases are placed on accumulating available radiocarbon dates and data on overlapping distributions.

In the final chapter, the cultural history of Southwestern Manitoba is stressed. The limited data from earlier research are re-assessed and combined with the new local data, the data from outside the region, and the new model to produce a dynamic culture history of groups co-existing, changing territories, changing adaptive strategies, and creating new interregional interactions. The available evidence demonstrates that the archaeological record is incomplete, but it also demonstrates that the earlier model of a single, historic focus is inadequate and that there were possibly as many as fourteen different ceramic-producing groups who utilized Manitoba. Furthermore, on the basis of the fluctuating resource potential, the ethnohistoric data, and archaeological data, it is proposed that the grasslands of Southwestern Manitoba were used primarily for seasonal bison hunts.

CHAPTER 2

THE PHYSICAL ENVIRONMENT

Introduction

The archaeological research universe of Southwestern Manitoba incorporates a somewhat arbitrarily defined part of the North American continent. It has a specific physical environment consisting of a number of organic and inorganic forms.

In order to assess the resource potential of the region, it is necessary to compare the resources within the region against the resources in adjacent areas during each season of the year. In order to develop a Multi-Zonal Resource Potential (MRP) Model for the region, the geological, vegetational, faunal, and non-organic resources must be considered within and beyond the boundaries of the region.

The data base line consists of the major physiographic zones, vegetation zones, climatic seasons, and major faunal resources. These data demonstrate the short-term, synchronic variability. The long-term diachronic variability is assessed on the basis of limited palaeoenvironmental data.

Physiography

Southwestern Manitoba Region

The research region consists of 5 major physiographic areas: Souris Basin, Reston-Tilston Plain, Tiger Hills, Waskada Till Plain, and Turtle Mountain

(Figure 4). The main portion is the Souris Basin which is a relatively flat broad expanse of lacustrine deposits representing the bed of proglacial Lake Souris (Ellis and Shafer 1940: 22). Along the western edge are a series of glacial lake deltas and along the eastern edge is boulder till.

The Souris River Valley and the "Blind Souris" valleys represent major proglacial drainage channels. They are broad and shallow, approximately 800-1600 metres wide and 30 metres deep. The west channel contains the Souris River and numerous oxbows which are wet in the spring. The east, or "Blind Souris", channels are dry, grassland valleys separated by uneroded plain and which contain water only as spring marshes or intermittent streams. The term, Blind Souris, is the common local expression for these dry channels.

To the west, the Reston-Tilston Park Area consists of undulating boulder till with numerous undrained depressions that are either seasonally wet grassland sloughs or permanently wet, tree-ringed prairie ponds (Ellis and Shafer 1940: 20). This area is traversed by several stream channels, 400-800 metres across, which contain intermittent streams or streams with highly variable seasonal flow patterns.

The Tiger Hills Area consists of a hilly, morainic unit which becomes the Brandon Hills to the north. The topography consists of sharply morainic to undulating morainic hills with depressions containing saline potholes and alkali sloughs (Ellis and Shafer 1940: 21-22).

The Waskada Till Plain consists of glacial drift or boulder till varying from level to gently rolling to undulating topography. Shallow potholes are numerous. Within this area is the broad, very shallow Whitewater Lake.

The Turtle Mountain area is a Tertiary outcrop which rises sharply to

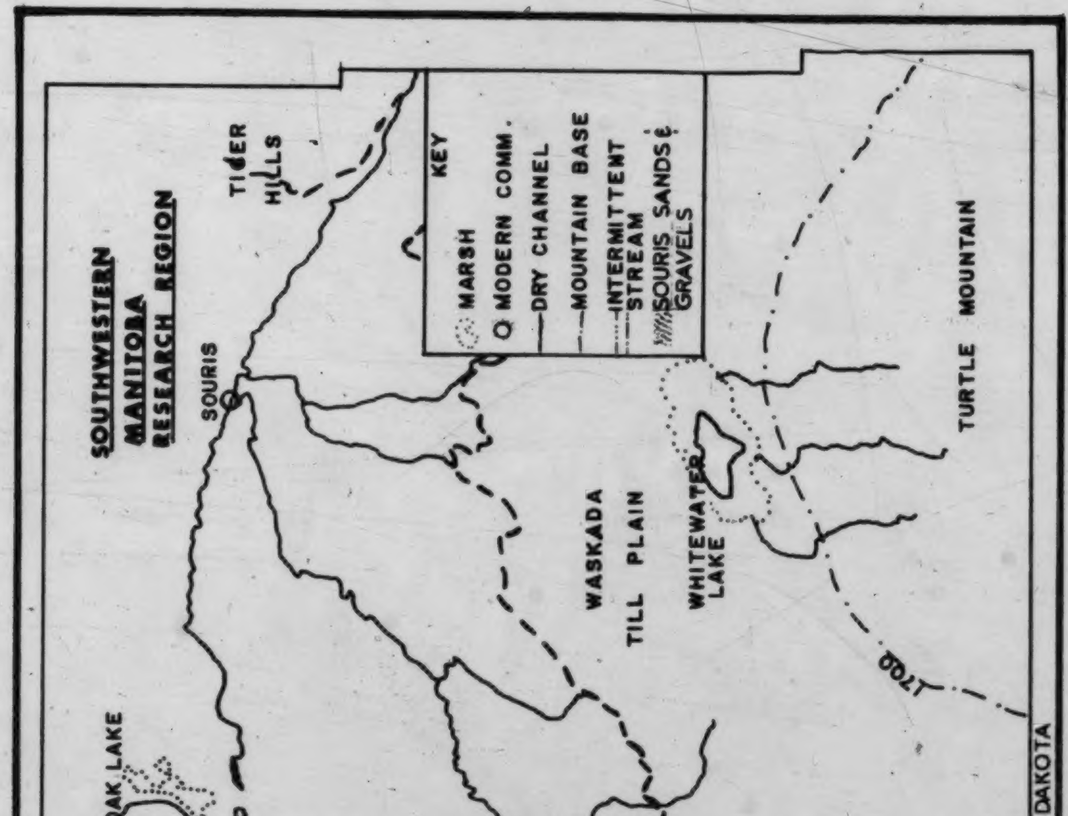

SOUTHWESTERN MANITOBA RESEARCH REGION
KEY
MARSH
MODERN COMM.
DRY CHANNEL
MOUNTAIN BASE
INTERMITTENT STREAM
SOURIS SANDS & GRAVELS
TIGER HILLS
SOURIS
OAK LAKE
WASKADA TILL PLAIN
WHITEWATER LAKE
TURTLE MOUNTAIN
1700
NORTH DAKOTA
MAN
PIPESTONE CREEK
STONY CREEK
RESTON - TILSTON PARK
SOURIS BASIN
MELITA
CREEK
GRAHAM CREEK
BLIND SOURIS CHANNELS
GAINSBOROUGH CREEK
ANTLER RIVER
SASKATCHEWAN

Figure 4. Southwestern Manitoba Research Universe Showing the Physiographic Sub-Units (After Ellis and Shafer 1940)

ca. 200 metres above the surrounding Waskada Till Plain (Ellis and Shafer 1940: 13). The upper portion contains numerous basins which consist of small lakes, sloughs, and meadows, whereas the lower levels contain numerous distinct ravines which provide channels for many intermittent streams.

The Northern Plains

The Southwestern Manitoba Research Region forms part of the Saskatchewan Plain between the Manitoba Plain to the east and the Alberta Plain to the west (Figure 5) (Acton, et. al. 1960; Bostock 1970: 20-21). The western edge of the Saskatchewan Plain is demarcated by the Missouri Coteau and the eastern edge drops onto the Manitoba Plain along the Manitoba Escarpment. The Manitoba part of the Saskatchewan Plain is referred to as the Manitoba Uplands (Weir 1960). It is gently undulating with surface elevations ranging from 450 to 480 metres above sea level (Bostock 1970: 20). The escarpment is dissected by several rivers of which the Assiniboine and Saskatchewan Rivers are the major channels in the Canadian prairie provinces. These rivers have a series of major and minor tributaries with the Souris River representing the major channel within the research universe.

There are a number of low hills such as Turtle Mountain, Riding Mountain, and Duck Mountain which represent erosional remnants of the Missouri Coteau. These hills contain a variety of lakes and small streams.

To the west of the Saskatchewan Plain is the Alberta Plain. The eastern boundary is the Missouri Coteau, the western boundary is the foothills of the Cordilleran Mountains, the northern edge blends into the Alberta Plateau, and in

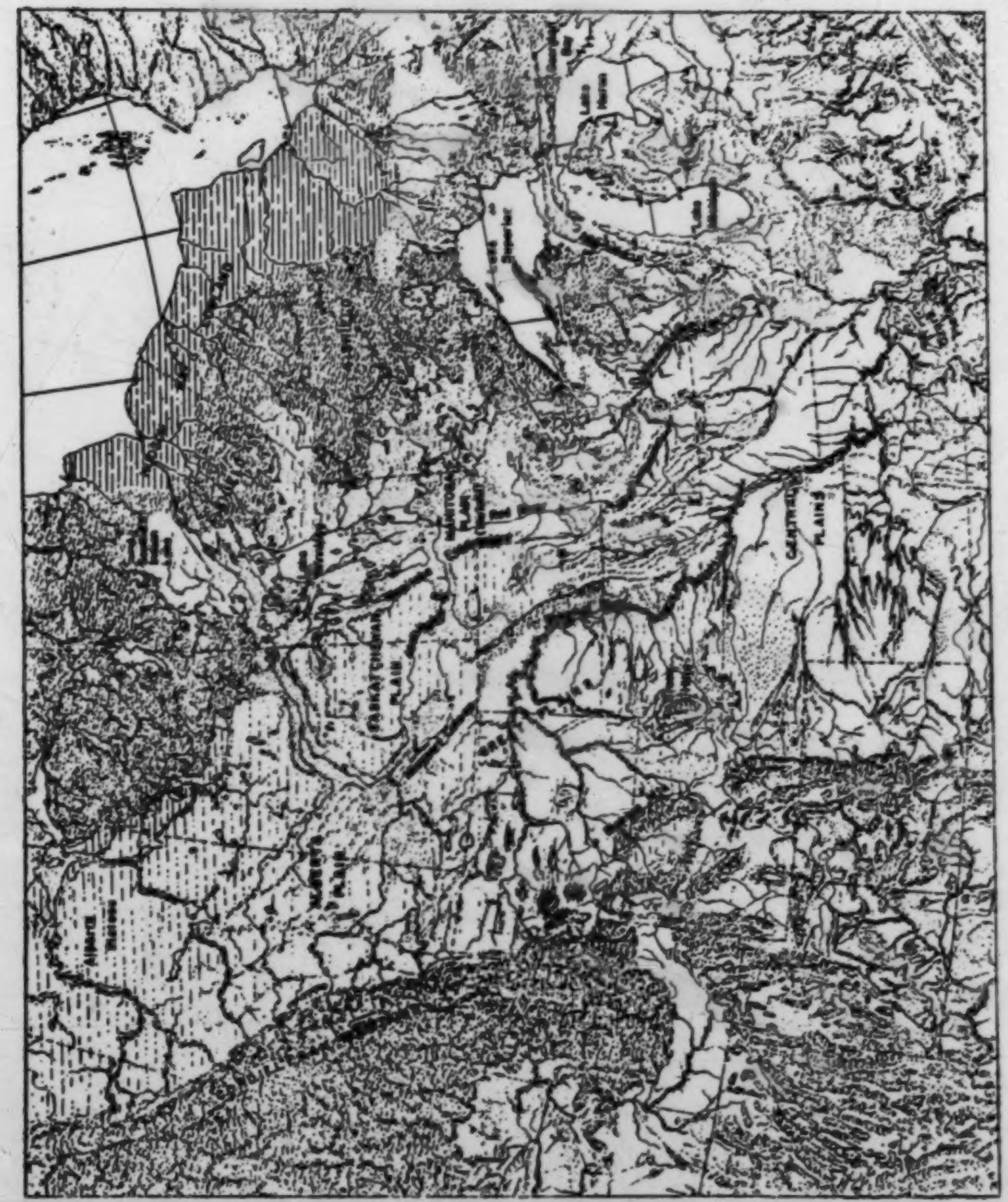


Figure 5. Geophysiographic Variability of the Continental Interior Relating to the Research Region (Based upon Lobeck 1948).

the United States it becomes part of the Western High Plains. Much of the plain is about 762 metres above sea level although there are a series of widely spaced hills such as the Neutral, Cypress, and Porcupine Hills with elevations up to 1432 metres and river valleys such as the Saskatchewan River which are incised to depths of 61 to 122 metres.

To the south of the research region, the Plains are divided into two major physiographic areas--the Northern Great Plains to the west and the Central Lowland to the east (Fenneman 1931, 1938; Hunt 1967). The Northern Great Plains, also known as the Missouri Plateau, consists of terraced plains, wide valleys, isolated mountain remnants such as the Black Hills and the Cypress Hills, as well as ridges, hills, cliffs, and flat-topped buttes (Wedel 1961: 27).

To the east of the Missouri Coteau, the Central Lowland extends southward to southern Texas. This physiographic area is covered with deeply buried glacial till with a gently rolling topography, innumerable lakes, marshy areas, and boulder fields. To the south, the topography has been altered by thick beds of aeolian deposits, particularly in the Central Plains of Nebraska and Kansas (Wedel 1961: 27-28).

The Missouri River is the main river system. It, like many of its tributaries, drains from the west and produces numerous valleys that dissect the plains. The river valleys are frequently terraced. The Missouri River has broad, flat floodplains but many of the tributaries have narrow, V-shaped valleys which lack extensive floodplains.

To the east of the research region, the Manitoba Plain, also known as the Manitoba Lowland or first prairie level (Weir 1960: 2-4), consists of a very gently undulating (3-7.6 metres) to flat (under 3 metres of local relief) surface with an average elevation of ca. 244 metres above sea level. The southern portion has been smoothed by the deposition of clays and silts of Glacial Lake Agassiz (Bostock 1970: 21).

The Eastern Shield

The Shield area to the east and north of the Manitoba Plain consists of a relatively flat eroded core of Precambrian crystalline rocks (Bostock 1970: 10). Much of the area has a local relief of 61 to 91 metres and the surface is comprised predominantly of lakes, ponds and swamps which tend to be interconnected with a lace of rivers and streams. Bedrock is frequently exposed, or covered with a mantle of mosses and very little soil.

To the north, the Shield becomes the Hudson Bay Lowland. This area consists of "a low, swampy, marshy plain with subdued glacial features and a belt of raised beaches that border the bay" (Bostock 1970: 15).

Vegetation Zones

Southwestern Manitoba Region

Southwestern Manitoba has been classed as an open grassland with a mixture of tall grass prairie to the east and the short grass plains to the west in which communities are dominated by species of grama and spear grass in the mature area (Weir 1960: 20, Plate 10). However, the Southwestern Manitoba Region demonstrates considerable variation since it straddles the area in which the mixed grass prairie shifts to Aspen Parkland (Figure 6). In local habitats around lakes and in ravines, shrubs such as saskatoon, silverberry, snowberry, and dogwood predominate (Weir 1960: 20).

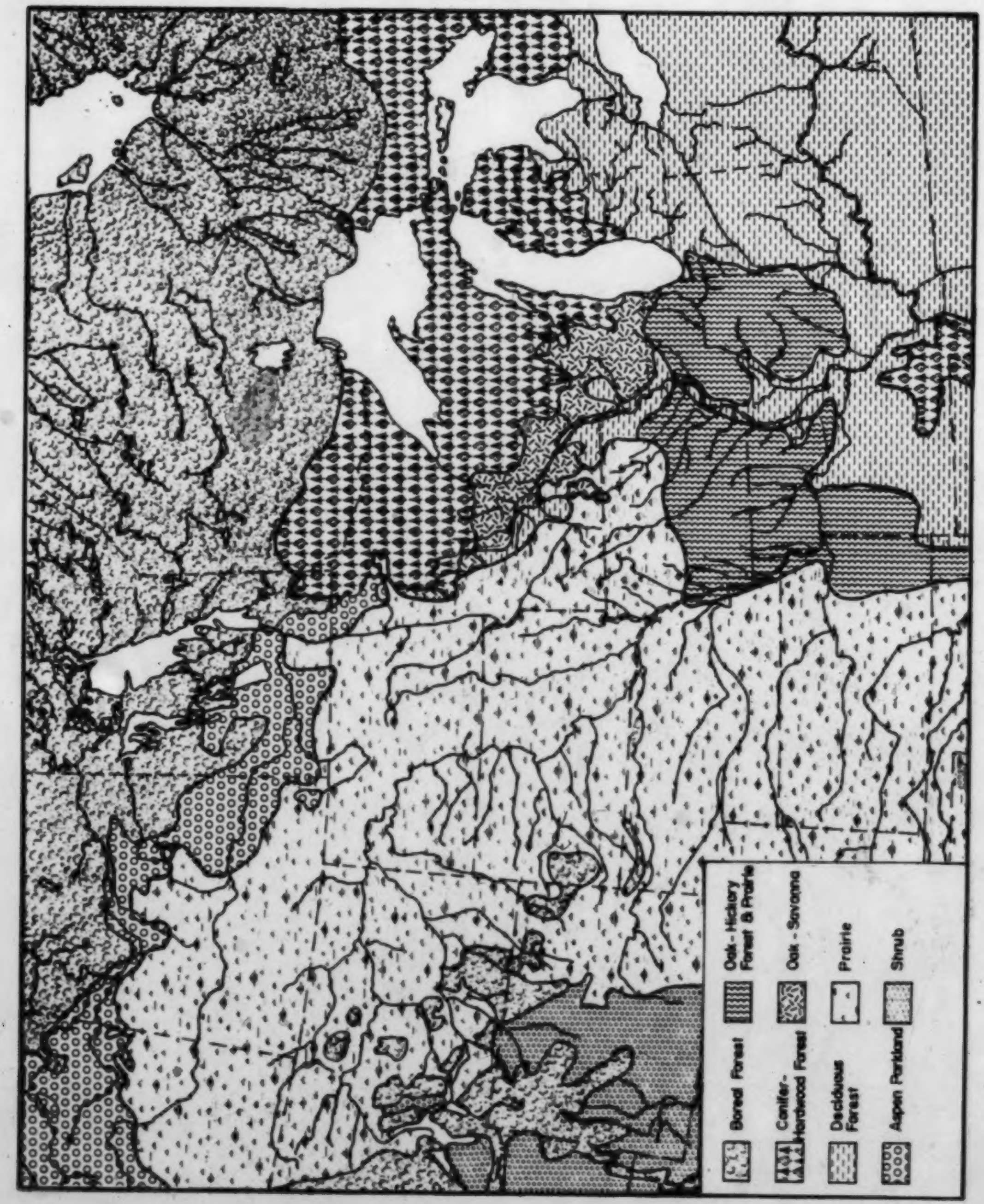

Boreal Forest
Conifer-Hardwood Forest
Deciduous Forest
Aspen Parkland
Oak-Hickory Forest & Prairie
Oak - Savanna
Prairie
Shrub

Figure 6. Vegetational Variability of the Continental Interior Relating to the Research Region. Simplified from Rowe (1972) and Kuchler (1964).

In the river valleys, the Manitoba maple or box elder, American elm, lance-leaved or green ash floodplain community predominates(Bird 1961: 13-14). Bur oak is found in localized concentrations, particularly on Gainsborough Creek, and willow is found on sand bars and close to the river (See Appendix A-1).

The Souris Basin area is an extensive grassland with local wooded areas in the Souris River valley, the valleys of the tributaries, and low wet spots in some sand dune parts. The southern portion contains purple pin-cushioned cactus and prickly pear cactus which are confined primarily to the uncultivated "Blind Souris" valleys.

At the time of European settlement in the early 1880's, the prairie levels in the southern portion of the research area had only grassland vegetation. The river valleys tended to be covered densely with trees, primarily elm.

In addition to the grasses, there is a wide variety of herbaceous plants and shrubs of which at least the following were of some importance by one or more Native groups: early white onion, buffalo plum or bean, Indian bread-root, chokecherry, hazel, black currant, hawthorn, nannyberry, and saskatoon (Ellis and Shafer 1940: 22-26 and Appendix A-2).

The Reston-Tilston Park provides a series of seasonal and permanent sloughs which are ringed with various rushes, sedges, then willows, then aspen poplar, a zone of shrubs, and finally grassland. These prairie potholes provide a parkland appearance.

The Waskada Till Plain consists primarily of mixed short and tall grasses and a variety of grass-like herbaceous plants (Ellis and Shafer 1940: 19-20). Trees are confined to ravines and a few small clusters of aspen in the northern part.

The saline or alkaline depressions and the environs of Whitewater Lake contain alkaline-resistant herbaceous plants.

The Tiger Hills in the northeastern part were covered with mixed forest and grassland prior to cultivation. "The northern and eastern slopes of the higher hills and knolls were covered by woods, but the southern and western slopes were under grass" (Ellis and Shafer 1940: 22). The bur oak dominates in the upper parts of the slopes but is replaced by aspen poplar on the lower slopes. The trees are fringed by zones of shrubs which include American hazel, dogwood, snowberry, chokecherry, pin cherry, hawthorn, saskatoon, prairie rose, gooseberry, nannyberry, and silverberry. The depressions are surrounded by willow, tall grasses, and sedges such as the great bulrush.

The native vegetation of the upper slopes of Turtle Mountain consists of "deciduous trees and shrubs with an undergrowth of herbs and grasses" (Ellis and Shafer 1940: 16). Aspen poplar and white or paper birch are most common, but bur oak, green or lance-leaved green ash, Manitoba maple and balm-of-gilead poplar are also found. The same assortment of shrubs as in the Tiger Hills is found with the addition of the high bush cranberry. Open upland meadows are covered with a variety of grasses as are the slopes at the base.

The vegetation within the research region is highly variable both in terms of distribution and composition. The forested areas of the valleys, Tiger Hills, and Turtle Mountain provide alternative habitats for animals that would otherwise not be found in a strictly grassland biome and, could provide shelter for man. The assortment of shrubs provide a wide variety of fruits. Specific trees such as the white birch and American elm provide potential raw materials for habitation coverings and containers. A variety of grasses and herbaceous plants provide sources of food, medicine and possibly habitation covers, e.g., bulrush mats.

In addition to the wild vegetation, the potential of two other plants must be considered. Domesticated corn and wild rice which were artificially planted and harvested may have been part of the plant resources. Wild rice used to grow in the Souris valley near the United States border prior to the 1930's, before the present drainage ditch was dug (Ken Williams 1971, personal communication). This location is well outside the normal distribution of wild rice which indicates that it must have been imported by human or animal agencies.

Corn was grown regularly by Missouri River village tribes within approximately 100 miles of the research region. Evidence of Native strains of corn have not been found within the research region to date, however, Native corn was grown successfully to the northeast, along the Assiniboine River at several localities and at Netley Marsh (the mouth of the Red River) in the early 1800's by the Ottawas and Saulteaux (Moodie and Kaye 1969). Mandan strains of corn were apparently being used and gardens were primarily on sandy soil near lakes.

There is considerable climatic variability and differential growth potential in southern Manitoba. E.F. Shaykewich (1974) compiled data from over 30 weather stations for the last 17 to 40 years. He found that:

a) the southwestern portion of the province had 100-110 average frost-free days above 0° C which was the shortest period for southern Manitoba;

b) 279-330 mm of precipitation for the May 1 - September 30 period with relatively little variation from region to region;

c) a soil water deficit on August 13 of 5 and 6 in a range of 1-6 which is considerably higher than the rest of the southern portion of the province;

d) 2800-2900 degree days above 5.6° C for the period May 1 - September 30 which is higher than the other regions except for the Red River valley;

e) 2300-2400[2] corn heat units (units used to estimate the potential of an area for grain corn production); and

f) the Southwestern Region has a lower potential for agriculture than the Red River valley and the Portage la Prairie region, the latter having optimum conditions (Shaykewich 1974).

While the preceding comments do indicate relative agricultural merits of the research region compared to surrounding regions, there are several variables that must be considered when transposing this data to the growth of Native corn. The growing periods for the Eastern Flint varieties of corn are less than the modern commercial corn varieties. Gaspé Eastern Flint corn has the shortest required growing season and can reach maturity in seven or eight weeks (Robert Hamilton[3] 1974, personal communication). This time period, 6-7 weeks, is approximately one-half of the average frost-free period recorded for Southwestern Manitoba for the last 30 years.

Variables other than temperature must be sought to account for the absence of known horticultural villages. The nature of the soil in the Souris River floodplain, which is deficient in phosophorous, calcium, and nitrogen, or lack of flooded floodplains, or a variety of cultural factors may be an important factor.

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[2] These figures have not been adequately correlated with units for southern Ontario where 2600 corn heat units are needed for modern commercial corn, but they do indicate that the figures for Southwestern Manitoba are lower than for the Red River valley and the lower Assiniboine River valley.

[3] Dr. Robert Hamilton is currently conducting research at the Federal Agricultural Research Station, Brandon, Manitoba, in producing high yield commercial hybrid corns from Flint corn and modern hybrids.

The Grasslands of the Northern Great Plains

The mixed grass prairie of the research region represents the northeastern boundary of the Northern Temperate Grassland Biome. "The combined tall-grass and mixed grassland extends from the deciduous forest to about 104° West longitude, near the western boundaries of Kansas and the Dakotas" (Shelford 1963: 329). Between the western edge of the above zone and the Rocky Mountains lies the short-grass grassland. This vast area of multiple grassland forms extends from the southern portion of the Canadian prairie provinces to Texas and into northern Mexico. This area does not, however, consist only of vast expanses of rolling or flat grasslands. Environmental variability is maintained by means of potholes, wooded slopes, and wooded river valleys.

Potholes consist of natural, undrained ponds and lake basins in the glaciated prairie region (Stewart and Kantrud 1969: 58). This "wetlands" region exists primarily in glacial drift deposits in the northern prairie portions of the Central Lowland and Great Plains, including southern Alberta, southern Saskatchewan, extreme southwestern Manitoba, extreme northeastern Montana, northern and northeastern North Dakota, eastern South Dakota, and parts of eastern Iowa (Stewart and Kantrud 1969: 58). The potholes are highly variable and range from wet meadow depressions submerged only in the spring to year round open-water lakes (Millar 1969; Stewart and Kantrud 1969).

The Northern Grasslands biome demonstrates vegetational heterogeneity due to clusters of wooded areas (Shelford 1963; Wells 1965). The streams are skirted by forest extensions from the East which stretch two-thirds of the way across the mid-continental grasslands. Also, numerous topographical units such as the Missouri Coteau and the Blackhills have steep slopes and local relief which become refuges for stands of deciduous and/or coniferous trees. Turtle Mountain is an example of an isolated "forest island" in the Grassland expanse.

Aspen Parkland Ecotone

The Aspen Parkland Ecotone is a transitional zone between the Grassland and Southern Coniferous Forest (Bird 1961; Shelford 1963). The traditional, pre-agricultural setting was characterized by a mosaic of two principal vegetation communities, the grassland community and the aspen poplar forest community, which shifted in relative frequency from the edge of the grassland to the edge of the coniferous forest (Bird 1961: 4). Within the grassland community was a variety of plant combinations based upon different frequencies of species of grasses, forbs and shrubs. These will be treated here as a combined unit.

The grasses varied from tall-grass forms in the east to a mixture of tall and short in the southern and western portions of the ecotone. Extensive areas of western snowberry and wolf willow existed. An herb of considerable importance was the Indian turnip or breadroot.

In the forested areas, aspen poplar was predominant. In addition to the upper tree story, there was a shrub stratum which included a variety of nut and berry trees, including the hazelnut, highbush cranberry, choke cherry, pin cherry, saskatoon, and rose.

The Aspen Parkland, like the adjacent grassland, had numerous rivers, potholes, and lakes. Along the floodplains of the rivers, different forest communities developed; in decreasing order of abundance were Manitoba maple or box elder, lance-leaved ash, American elm, cottonwood and basswood. On the sandbars and low banks were found stands of willow (Bird 1961: 5-17).

The potholes varied in size, degree of permanency, and make-up of associated vegetation (Kiel, Jr., et al 1972: 34-35). In addition to a variety of submerged aquatics, plants found in and around the potholes included sedge, whitetop, cattail, bulrush, spike rush, willow and aspen. However, in one controlled sample, aspen and/or willow rimmed less than one-half of the margin of two-thirds of potholes (Kiel, Jr. et al 1972: 35). Ground water, precipitation, fires, and foraging by animals affected the traditional make-up of these potholes.

Much of Southwestern Manitoba is now Aspen Parkland but this is due to planting by settlers, control of prairie fires, and reduction of herds of grazing animals such as bison and wapiti. Prior to European settlement the Aspen Parkland was confined to the eastern and northern portions within the region and to the east, north, and northwest of the region. Early accounts of the research region limit forested areas to Turtle Mountain, Tiger Hills, river valleys, and the oak grove on the east side of Oak Lake (Hind 1860; Bird 1961: Map 2).

Oak-Hickory Forest and Prairie and Oak Savanna

To the southeast of the research area, the Aspen Parkland shifts to Oak Savanna and Oak-Hickory Forest and Prairie. The transition from Aspen Parkland to other forms of forest-prairie ecotone takes place in northern Minnesota. Shifts in this transition include oak replacing aspen, increase in balsam, poplar, sumac, paper birch, hawthorn and crab apple, as well as the replacement of choke cherry by wild plum and snowberry by coralberry (Shelford 1963: 319).

The Oak Savanna which is found primarily in Wisconsin, Minnesota, and North Dakota consists of tall grass prairie with broadleaf deciduous trees scattered singly or in groves (Kuchler 1964: Legend 81). Dominant plants are big bluestem grass, little bluestem grass and bur oak; other less common forms are sand reed, shagbark hickory, northern comandra, spurge, green ash, wild bergamot, white oak, jack oak, black oak, rose, Indian grass, and porcupine grass (Kuchler 1964: Legend 81).

The Oak-Hickory Forest and Prairie (as defined by Kuchler 1964) corresponds in area approximately to Brown's (1965) Prairie Peninsula. It lies to the south and southeast of the Oak Savanna in a triangular wedge with the base slightly west of the Missouri River and the tip to the south of Lake Michigan. This ecotone is marked by variable distribution of a variety of forest species including oaks such as bur oak, dwarf chinkapin oak and red oak, bitternut hickory, shagbark hickory, and basswood; these forest clusters frequently have a shrub edge which includes wolfberry, coralberry, dogwood, smooth sumac, as well as such berry producers as gooseberry, raspberry, wild plum, and grapes (Shelford 1963: 308-312).

Boreal Coniferous Forest

The Boreal Coniferous Forest is a broad, expansive biome to the north of both the Aspen Parkland ecotone and the Great Lakes. It encompasses much of the forested area of Canada (Rowe 1972: 6). While there are variations in frequencies of various species due to drainage, soil formation, fire, historical factors and location, the following are dominant species throughout most of the biome: black spruce, white spruce, jack pine, tamarack, balsam fir, aspen, balsam poplar and white birch (Rowe 1972: 30-33, 36, 41-43). In locations of better drainage such as along the sides of rivers, edges of islands, and on low ridges, the most common forest elements are white spruce, balsam fir and the deciduous balsam poplar and trembling aspen. Peripheral regions along the Aspen Parkland ecotone contain varying quantities of white elm, green ash, Manitoba maple, eastern white cedar, and bur oak. As important, if not more important, than the forest vegetation are the moss covering and the variety of riparian and plant habitats associated with the shorelines of the innumerable lakes, rivers and bogs or marshes. Principal shrubs include Labrador-tea, bunchberry, sour-top-bilberry, and mountain-ash (Shelford 1963: 124).

Subarctic

The Subarctic vegetation zone corresponds approximately to the Hudson Bay lowlands physiographic region in eastern Manitoba and northern Ontario. Rowe (1972: 20, 55) places this vegetation zone within the Hudson Bay lowland and Northwestern Transition biome. Immense areas of bog, muskeg, and barren rock exist (Ritchie 1962; Rowe 1972). The abundance, variety, and size of the trees are less than in the true Boreal Forest. Open woodlands with a predominance of stunted black spruce and tamarack plus the presence of white spruce, balsam fir and white birch occur primarily along the riverbank levees. A dense covering of lichen occurs almost everywhere.

Conifer-Hardwood Forest

The Conifer-Hardwood Forest Zone is the mixed deciduous forest around the Great Lakes area. It includes the variations of Rowe's (1972: 92-111) Great Lakes St. Lawrence Forest Region and Kuchler's (1964: 17-29) Northern and Upland Regions of the Temperate Deciduous Forest Biome. The overall vegetation is described as a :

> . . . forest of a very mixed nature, characterized by the eastern white and the red pines, eastern hemlock and yellow birch. With these are associated certain dominant broadleaved species common to the Deciduous Forest Region, such as sugar maple, red maple, basswood, and white elm. Other wide-ranging species are the eastern white cedar and largetooth aspen, and to a lesser extent, beech, white oak, butternut, and white ash. Boreal species, such as the white and the black spruces, balsam fir, jack pine, trembling aspen, balsam poplar, and white birch are intermixed, and in certain central portions as well as in the east, red spruce becomes abundant. (Rowe 1972: 11)

The above general statement does not do justice to the variety of plant forms that do exist,many of which are potential sources of high yield resources. In the Huron-Ontario region which makes up the main portion of the Ontario peninsula, the vegetation includes the northern limits of sycamore and black walnut, the southern limits of jack pine, sugar maple, beech, white ash, red ash, yellow birch, red maple, red, white and bur oaks, eastern hemlock, eastern white pine, balsam fir, scattered stands of large tooth aspen, butternut, butternut hickory, hop-hornbean, black cherry and black oak, and along the river bottoms and swamps, stands of blue beech, silver maple, slippery elm, rock elm, and black ash (Rowe 1972: 93).

To the south of the Great Lakes, there is a shift from predominately spruce-fir evergreen forest in the uplands and conifer bog forest in the lowlands of northern Minnesota, Wisconsin and Michigan to a predominance in the southern parts of the same states of sugar maple, yellow birch, beech, red spruce, and hemlock.

This area was important in the historic period for the intensive utilization of two plants. Domesticated corn was cultivated to support large, sedentary populations. Wild rice was harvested intensively and was spread beyond its normal distribution by planting in lakes for harvesting and/or for attracting waterfowl.

Deciduous Forest

The Deciduous Forest stretches from the southern portions of the Great Lakes to the Gulf of Mexico. The northern portion of this zone, which is adjacent to both the Oak-Hickory Forest and Prairie zone of the Prairie Peninsula and the Conifer-Hardwood Forest of the Upper Great Lakes, consists of oak-hickory forest, maple-basswood forest, elm-ash forest, and beech-maple forest (Kuchler 1964: Legends 99-102). A large group of trees occur in various seral stages; these include willows, cottonwoods, common choke cherry, red maple, American elm, slippery elm, hackberry, sugarberry, and bur oak (Shelford 1963: 21).

Climatic Seasonality

The following climatic reconstruction is by necessity a general model based upon changes in mean values of factors such as temperature, precipitation, and cloudiness. A complete description of a place or area showing all variations that may occur from day to day or from year to year in terms of averages, extremes and ranges of all characteristics is virtually impossible (Longley 1972: 1). Therefore, it is necessary to select those aspects of weather that are most important, such as mean values of temperature and precipitation. The seasonal reconstruction is based primarily upon the synthesized data in The Climate of the Prairie Provinces (Longley 1972). Emphasis is placed upon the specific values of various climatic data for the Southwestern Manitoba Region accompanied by general statements about near-by areas.

Spring

Spring is a relatively brief period which usually lasts from the latter part of March until early May. Temperatures rise rapidly but are highly variable with March readings of -18° to 27° C. The mean daily temperature for April is 2.5°C. Most of the snow is melted by the end of March. Precipitation rates increase considerably from 25.4 to 50.8 mm in March to 50.8 to 101.6 mm in May. Thunderstorms occur infrequently. Spring floods and ice jams are a regular phenomenon.

Winds are common and occur most frequently in May. The western Canadian Plains are noted for being an environment of high winds, partially due to uniformity of topography and paucity of vegetation.

In the Boreal Forest to the north, spring arrives several weeks later. To the west and south, the temperature is warmer and the precipation is lower. Large bodies of water such as Lake Winnipeg have a moderating effect upon the climate of the adjoining landscape. These lakes result in a reduction of the temperature extremes and a lower median temperature.

Summer

Summer is the warm period lasting from approximately June to the end of August. There may be a few frosts in the first half of June. In the research region, the mean daily temperature for July, the warmest month is 19° to 20°C (Longley 1972: 22-24). The last frost (0°C) in spring tends to be May 28. The number of frost free days above 0°C is 110 for most of the research region (Shaykewich 1974: 4-5). The mean number of days above 26.5°C is 40-50 days and maximum temperatures of 35°C have been recorded.

Precipitation is highest during the summer. The mean June-August precipitation is 203-229 mm. Early summer storms tend to be widespread, whereas the late summer storms are localized. These storms can be thunderstorms accompanied by lightning, heavy rainfall, or hail storms. The impact of lightning storms on the pre-European grasslands has not been quantified but the probable impact can be appreciated by recent studies of the Alberta Forest Service which estimates that 45 per cent of forest fires in Alberta are started by lightning fires (Longley 1972: 30).

The wind pattern for the summer tends to consist of strong, gusty winds of brief duration. In comparison to other seasons, winds tend to be minimal (Longley 1972: 34).

The days are longer and warmer. The amount of cloudiness increases and is highest in June but this increase in cloudiness is offset by increased daylight hours. Summer can be characterized as a warm to hot, dry, moderately windy and cloudy climate punctuated by storms.

Autumn

Autumn in the research region is a relatively brief period. It lasts from early September until October or early November. It is a period of decreasing temperatures, frosts, snow, increased cloudiness and increased fog. The temperature drops about 0.56°C for every two days between September 15 and November 15. Frosts and high temperatures occur and can fluctuate rapidly. The mean date for first frosts, 0°C, is September 12 (Shaykewich 1974: 6) but there can be temperatures in the 27°C range afterwards. By mid-November, the ground is usually covered with snow.

The mean precipitation rate for the 3 months is 89-102 mm with most of it falling during September. In September, the precipitation is mainly rain but in November it is mainly snow. The shorter number of hours of daylight, the decreasing temperatures, and increasing cloud cover reduce the amount of sunshine.

Winter

If criteria such as the period of snow cover are used, winter lasts four to five months, starting in November and ending in April. It is characterized by deep snow, light winds, cold temperatures, occasional blizzards, and clear skies. For the research region, the mean daily temperature in January is between -17.5°C. and -15°C. The mean annual amount of snow during this period is 1270 mm which is equal to 127 mm of rainfall.

Blizzards are an important feature of the winter climate. Blizzards are defined by winds of 40 km/hr or more, temperatures below -11.5°C, and visibility of .8 kilometre or less in blowing, drifting, or falling snow. These are minimum requirements. Often there would be total "white outs" when visibility was nil, winds could be 64-88.5 km/hr and gusting to 112.6 km/hr, with temperatures of -34°C.

Faunal Resources

The major biomes had distinctive groupings of associated fauna. This section deals with the major animal resources and concentrates on those forms that were major resources for human populations seasonally or throughout the year.

Faunal resources include animals that are:

a) primary subsistence resources that provide most of the basic items, such as bison on the Plains;

b) peripheral resources that augment the main resources;

c) starvation resources utilized only during periods of food shortage;

d) non-resources that are not utilized because of cultural values, lack of procurement techniques, or availability of more desireable resources (see Appendix A-2 for the scientific names of animals used throughout the text.).

Species that are subsistence resources are large to medium-sized animals and/or animals that accumulate in large numbers on a seasonal basis. Important variables for the assessment of faunal resources are animal size, tendency to concentrate or disperse, seasonal movement, and distribution.

Subsistence resources represent the animals which influence the movements of people most strongly. Any efforts to account for regional preferences requires a comparison of the relative importance of subsistence resources within and beyond the regional boundary on a seasonal basis.

The peripheral and starvation resources are important for augmenting diet during sudden or unusual changes in the over-all resource potential, or for providing non-local resources that are utilized in small quantities. The identification of peripheral or starvation species are also useful indicators of seasonal utilization.

The importance of several species varies between biomes depending upon whether the human populations follow a focal or diffuse economy. A focal economy is a specialized economy relying upon one or a few resources in abundant and reliable quantities, whereas, a diffuse economy is based upon a variety of resources that are less numerous and/or reliable (Cleland 1966: 42-45). These concepts must be used on a seasonal basis since the resource potential of a region or resource utilization by a particular society may shift between these polar concepts or follow some intermediate form from season to season.

The animal resources of Southwestern Manitoba include vast numbers of species within the major categories of mammals, birds, fishes, reptiles, amphibians, and insects. Recent studies among the mammals alone indicate evidence of 63 species (Wrigley 1974). The insect and amphibian categories are omitted because there is no ethnohistoric nor archaeological evidence to indicate that they were used. The reptile category is omitted because the turtles are the only forms that were utilized and they were of very minor importance. Mammal, bird, and fish categories provide important subsistence and secondary resources.

The distributional data reflect the early historic situation which differs from present distributions (Hall and Kelson 1959; Soper 1961; Banfield 1974; Wrigley 1974). The distributions are based upon sightings and studies by early fur traders, travellers, and early settlers as well as projections on the basis of habitat preferences.

Mammals

The resource variability of mammals is reflected in the record for Southwestern Manitoba which includes small mammals such as the pygmy shrew and bat to large mammals such as bison (see Appendix A-3). Only those species of primary and secondary importance are considered (see Appendix A-4).

The mammals are divided into three size categories:

a) greater than 25 kilograms;

b) between 4.5 and 25 kilograms; and

c) less than 4.5 kilograms.

The large animals include all of the artiodactyls--bison, moose, elk, caribou, white-tailed deer and mule deer, and pronghorn antelope, as well as four carnivores --grizzly bear, black bear, cougar and wolf.

The bison, pronghorn antelope, and barrenground caribou gathered in large herds whereas the other species were diffusely distributed as families or small bands. The large, herd mammals offered the greatest resource potential. These animals were migratory, however, and provided a shifting resource potential. The significance of this shifting resource potential is discussed under the seasonal evaluation.

The medium-sized and small mammals were generally diffuse resources since they were non-herd animals. Two exceptions were the lagomorphs which were abundant in large numbers on a cyclical basis and the muskrats which were available in large numbers in marshy areas.

The presence of small and medium-sized mammals and diffusely distributed large mammals was important during periods when resource intensive herd animals were absent. However, the carrying capacity and adaptation of peoples relying upon the diffuse resources differed from the adaptive strategies of groups relying upon the more intensive resources.

The bison required more detailed consideration since it is the largest of the terrestrial mammals, has the highest resource potential, and was the most important animal on the Plains and Aspen Parkland during the early historic period (Hall and Kelson 1959; Soper 1961; Ray 1971; Arthur 1974; Banfield 1974; Wrigley 1974).

It was a gregarious animal which tended to live in large migratory herds and varied from groups of predominantly older bulls to groups consisting primarily of cows and a small number of males. These groups, however, frequently altered their composition by combining a group of bulls with a group of cows, by having subgroups (generally males) separating from the herd, or by changing structure due to mating or a response to danger (Arthur 1974: 42-43).

There has been considerable discussion about the nature of migratory movements of the bison. Banfield (1974: 405-406); Arthur (1974: 53-60); and Roe (1970) argue that the migrations were relatively small, involving movement of only a few hundred miles from summer to winter pasture. Ray (1971: 27-30) argues that the general seasonal cycle was one of grazing on the Plains during the summer and wintering in sheltered river valleys, mountains, and the Aspen Parkland during the winter.

Arthur (1974: 55-57) indicates that there were two major northern herds or divisions; a western herd associated with the foothills of the Rocky Mountains and upper Saskatchewan River, and a more easterly herd associated with the Missouri Coteau, Red River, parts of North Dakota and Southwestern Manitoba. Hind reported in 1857 a detailed description of their seasonal round:

> The band belonging to the Red River Range winter on the Little Souris, and south-easterly towards and beyond Devil's Lake, and thence on to Red River and the Shayenne. Here too, they are found in the spring. Their course then lies west towards the Grand Coteau du Missouri, until the month of June, when they turn north, and revisit the Little Souris from the west, winding around the west flank of the Turtle Mountain to Devil's Lake, and by the main river (Red River), to the Shayenne again. In the memory of many Red River hunters, the buffalo were accustomed to visit the prairies of the Assiniboines as far north as Lake Manitoba, where in fact, their skulls and bones are now to be seen; their skulls are also seen on the east side of the Red River of the north, in Minnesota, but the living animal is very rarely to be met with. A few years ago they were accustomed to pass on the east

> side of Turtle Mountain through the Blue Hills of the Souris, but of late years their wanderings in this direction have ceased; experience teaching them that their enemies, the half-breeds, have approached too near their haunts in that direction. (Hind 1860 (2): 108).

Palliser was also told in 1857 that the bison from the Plains moved into the forests of Turtle Mountain to winter (Arthur 1974 referring to Spry 1963: 48). Alexander Henry noted large herds in Manitoba in 1801 (Coues 1965). Thus, Southwestern Manitoba was within the main seasonal round of one of the two main divisions of the Northern Plains bison. Also, the bison could have been expected on the open Grasslands during the summer, while during the winter they sheltered in Turtle Mountain, the Aspen Parkland, and/or the river valleys.

These patterns of seasonal movement appeared to have been very regular; in fact, hunters could predict where they were most likely to find the animals at different seasons (Arthur 1974: 54). Hind (1860 (2): 107) maintained that in 1857, the ranges of the bison were being maintained with "great exactness".

Movements were affected, however, by fire, climate, or intensive hunting. Fires started as a result of lightning and Native activities; the latter included firing the grasslands to direct the movement of bison, to create an early crop of grass to attract the animals in the spring, and to set signals, or merely allowing a fire to get out of control (Arthur 1974: 22-27). Bison were attracted to fresh spring growth in a burned-over area as much as two weeks earlier than would otherwise have been their normal pattern. Fires could on the other hand, drive entire herds from an area as was the case with the major fire of 1856 that passed through the prairie and Aspen Parkland of eastern Saskatchewan and Southwestern Manitoba (Hind 1860 (1): 191).

Mild winters also affected the movement of bison. During the extremely mild winter of 1800-1801 the herds stayed in the Grasslands. Sedentary peoples living in the Aspen Parkland had to rely upon deer and/or face extreme food shortages (Ray 1971: 29-30). These mild winters and subsequent change in seasonal migrations appeared to have been rare, at least during the early historic period.

As pointed out earlier, intensive hunting by the Red River Métis is blamed for the herds shifting from the east side to the west side of Turtle Mountain. Later periods of intensive hunting farther west also disrupted the behaviour of the more westerly herds (Arthur 1974).

Bison provided a concentrated resource on a year-round basis in or near the Southwestern Manitoba Region. Their movements through this region attracted hunters from other areas. The shift from the summer to winter grazing provided an intensively concentrated resource in the wooded uplands, wooded river valleys, and Aspen Parkland during the winter. These seasonal rounds placed an adaptive premium on mobility for those groups who relied on this resource.

Birds

Bird resources were numerous and highly varied with respect to habitat diversity (Taverner 1928; Godfrey 1966; Anonymous 1969b). Major categories of birds, according to habitat utilization were:

a) water birds;

b) terrestrial game birds;

c) birds of prey;

d) shore birds;

e) miscellaneous terrestrial birds; and

f) perching birds (Godfrey 1966).

Only the water birds, terrestrial game birds, and birds of prey were of any importance. The others were either in the small range, i.e. less than .227 kg., and/or diffuse.

The water birds were represented by 40 species with two different seasonal, exploitation strategies for Southwestern Manitoba:

a) birds that arrived in the spring, nested during the summer, and migrated in the fall, and

b) birds that stopped during the spring and autumn on their flights north to their summer nesting grounds and south to their wintering grounds

(see Appendix A-6). Most of the birds that stayed throughout the summer settled on the ponds, sloughs, marshes, and rivers of the Grassland and southern Aspen Parkland "wetlands". As individual birds, they provided little potential since they ranged from 2 to 6.6 kilograms, but their presence in vast flocks provided an intensive resource. In the Aspen Parkland around Minnedosa, Manitoba, an area of 10,620 km^2 contributed at least one million ducks of eleven species at the annual fall migrations (Kiel, Jr. et al 1972: 54-55).

The transient species which nested in the Boreal Forest and Tundra and stopped briefly in the research region during the spring and autumn were the geese, mergansers, and whistling swan. These birds were larger, with a range of 6.6 kilograms to somewhat greater than 17.6 kilograms. Their potential also lay in their vast numbers.

The terrestrial game birds were medium-sized, i.e., .272 to 6.6 kg., non-migratory birds. They preferred mixed vegetation and travelled in small flocks. They were marginal resources.

The birds of prey served primarily as starvation foods. Certain species such as the eagles were highly valued for their feathers.

Fish

All of the rivers and lakes of Manitoba are part of the Hudson Bay Drainage. Within this major drainage basin are a series of regional clusters of rivers and associated tributaries. The research region is drained by the Souris River which enters the Assiniboine River. The southern portion of Manitoba is drained by three major river systems, the Assiniboine River drains most of the southwestern portions of the province, the Red River drains the southern portion, the Winnipeg River plus several small rivers drain the south-eastern portion, and the Saskatchewan River drains the western portion. All of these river systems flow into Lake Winnipeg, Lake Manitoba and Lake Winnipegosis which are drained by three main channels, the Nelson, Churchill, and Hayes rivers, which flow into Hudson Bay. The Souris River occurs primarily in Grassland, the Assiniboine and Red rivers in Aspen Parkland, and the remainder of the rivers plus Lake Winnipeg and Lake Manitoba in the Boreal Forest.

Fish were a seasonally intensive resource during spawning. Most fish spawned in spring from April to June and moved into rivers or shallow bays in concentrated groups (see Appendix A-7).

The fish resources in Southwestern Manitoba were limited primarily to northern pike, sucker family, catfish family, yellow perch, and burbot. The rivers of the Aspen Parkland, particularly the Red River, had twice as many species, including the lake sturgeon which was the largest form. The rivers and lakes of the Boreal Forest had a much higher resource potential because of the numbers of rivers and lakes involved and because they had three times as many species of large and medium-sized fish as were found in the research region.

Non-Organic Resources

Lithic Resources

The identification and nomenclature assigned to various raw materials used by prehistoric flint knappers in Manitoba is inconsistent and confused. Leonoff (1970) has produced the only work in which the problems of identification, distribution, and sources of various raw materials has been considered. No further work has been conducted to build upon this pioneering effort.

The utilization of different varieties of stone was highly variable. Leonoff calculated the percentages of various raw materials from a number of sites scattered throughout the province. He found that in the shield area of Southeastern Manitoba, basalt accounted for 40% and Selkirk chert accounted for 25% of all lithic tools and debris. In the western portion of the province north to Riding Mountain, Swan River chert and Knife River flint (also referred to as brown chalcedony) made up the bulk of the raw materials (Leonoff 1970: 42-58). Despite serious sampling problems in Leonoff's report, the generality that different materials were being used in different areas holds true and is evident from even a superficial perusal of collections from various parts of the province.

Furthermore, it is evident that different archaeological complexes through time reflect changing preferences for certain materials. Despite the fact that little systematic effort has been made to identify and quantify raw materials from Manitoba sites, certain trends are apparent. Projectiles from southern Manitoba demonstrate a preference for Knife River flint during the Paleo-Indian Period, Swan River chert for Archaic forms such as McKean, a return to Knife River flint during the late Archaic, an overwhelming preference for Knife River flint for Sonota projectiles, and a fairly high percentage of late side-notched projectiles of Knife River flint (Syms 1969; Leonoff 1970; Richards 1974). The details and implications of these changing patterns in lithic preferences are discussed in Chapter 5.

There were five basic sources for raw materials:

a) bedrock outcrops,

b) preglacial river deposits,

c) glacial till deposits,

d) sorted and redeposited river materials, and

e) imported materials.

The distribution of the first source is related to the geological history of the research region and surrounding areas. Southwestern Manitoba is covered with Wisconsin glacial till except for the upper levels of Turtle Mountain. This till has buried all bedrock and preglacial features under a deep mantle of redeposited earth and rocks. The only sources for lithic materials were scattered boulders, the river valleys, and preglacial outcrops such as Turtle Mountain. The river valleys either cut into and exposed preglacial features or resorted and produced concentrated clusters of rocks.

The main local sources of raw material for the western and southern portions of the province have been, therefore, scattered boulder fields, river sorted materials along river channels, and the occasional exposed preglacial feature. These sources must be assessed in terms of pre-agricultural availability, that is, they must exclude localities that have become available due to cultivation, gravel operations and construction. Since the region was traditionally covered with prairie grasses or woodlands, and since there would have been limited exposure of bedrock, raw material sources would have been restricted primarily to the river channels. Furthermore, most of the resources along the rivers would have been available only on a seasonal basis because they were covered with snow and frozen throughout the winter and submerged during the high-water flows of spring and early summer; the optimum period for obtaining these materials were during the late summer and autumn.

In contrast to the western portions of the province, the Shield area to the east consists of a glacial-scoured topography. It consists of bedrock exposed in many areas and covered only with a thin mantle of glacial till or lake clays in many other areas (Davies et al 1962: 11). The bedrock consists of a complex Precambrian mixture of volcanic sedimentary and intrusive rock formations described as follows:

> Briefly the volcanic rocks consist of light to dark coloured andesites and basalts (commonly ellipsoidal), volcanic breccia (andesitic dacitic, and rhyolitic) and tuffs. Interbanded with these in places may be coarse-grained massive hornblende-plagioclase rocks that have often been regarded as coarse centers of flows but more probably are sill-like intrusions related in origin to the volcanic rocks. The sedimentary rocks are mainly impure quartzites and grey-wackes, although conglomerate, slate, and arkosic

> rocks are also common. Stocklike masses and small batholic bodies of massive granitic rocks (actually most are tonalites) invade the volcanic-sedimentary series and in most areas are elongated parallel to the trend of these rocks. Outside the volcanic-sedimentary belts, and forming the bedrock over most of the Precambrian Shield, are complexes of "granite" and granite gneisses (here, also, many or most of the rocks are not true granites but closer to granodiorites and tonalites). Sedimentary and volcanic rocks associated with these granitic rocks may be extensively granitized. (Davies et al 1962: 16)

Despite the apparent differences between the Shield and more westerly areas, the problem is compounded by the fact that much of the till overlying the western portions of the province was scoured from the Shield area to the east and north. Thus some boulders and cobbles scattered throughout the western tills were potentially available; small amounts of Precambrian materials in archaeological assemblages could represent materials brought into the area by either human beings or glaciers.

Materials found in archaeological sites in southern Manitoba include tools of Swan River chert, sandstone, chert, agate, petrified wood, Cat-head chert, Selkirk chert, arenaceous chert, Bakers Narrows chert, granite, schist, gneiss, Knife River flint, catlinite, obsidian, and jadeite. Of these materials, several occur locally in the glacial till and stream beds. The most commonly used material was Swan River chert.

Swan River chert has been described as having:

> . . . wide variation both in surface texture and color, sometimes within the same hand specimen or cobble. It is not uncommon to find three or four different colored bands within one piece of material. The usual range of color is from cream white through to medium grey, pink to deep rust, (jasperoid), pale yellow to deep orange. The stone has a regular conchoidal fracture.
>
> Luster ranges from glossy to waxy to dull in appearance. Swan River chert also has considerable variation in texture from coarse crystalline to cryptocrystalline, within one piece. In some cases, pockets of clearly

> visible quartz crystals may be seen in the cortex, while the newly fractured surface shows a highly waxy and extremely fine texture.
>
> In thin sections the composition of Swan River chert was found to be quartz with chalcedony as a cementing medium. Large radial crystals are visible with fine chalcedony fillings . . . . (Leonoff 1970: 12)

There has been considerable confusion in differentiating between Swan River chert and quartzite. Both may have similar texture and pronounced colour variation.

The geological sources and distribution of Swan River chert are as yet poorly understood. It occurs in till deposits within the research region and is found in concentrations of water-worn cobbles in the stream beds. It has also been observed in large concentrations along the stream beds of the Swan River valley to the north. Leonoff (1970: 29) notes that large quantities of materials indistinguishable from Swan River chert have been found in the Red Deer River valley and other river valleys in Saskatchewan.

One hypothesis to account for this source is that it represents materials carried from the Rocky Mountains along preglacial river channels. A second hypothesis is that it represents glacial and post-glacially deposited chert from limestone bedrock in which the softer limestone has been eroded away. The latter hypothesis has several advantages in that:

a) Swan River chert does not exist in known pre-glacial river deposits such as the Souris Sands and Gravels,

b) it is extremely widespread, and

c) there is evidence of fossil "ghosts"[4] occurring in some fragments.

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[4] There are no actual fossils but under a hand lens the crystal structure appears in whorls and distinctive patterns, that resemble fossils (Harvey Young 1974: personal communication).

The sandstone source has never been traced. It could come from the Cretaceous deposits underlying the glacial tills of western Manitoba, or the Ordovician deposits that outcrop in the eastern part of the province. It appears to be confined to archaeological assemblages from the south-central and southwestern portions of the province where it was probably obtained from glacial till and river beds. One immediate source may have been the Paleocene Turtle Mountain Formation which forms the upper part of Turtle Mountain (Davies et al 1962: 145).

Small samples of chert, agate and petrified wood have appeared in various archaeological assemblages. One important source for these is the Souris Gravel and Sand Formation (Klassen 1969). It has been described as:

> . . . 20 to 75 percent of rock types of western (Rocky Mountain) provenance whereas typical glacial gravels include less than 10 percent. The western or 'pre-glacial' pebbles comprise a distinctive assemblage of subrounded to well-rounded quartzite, argillite, chert, agate and porphyritic volcanic rock types, whereas glacial erratics are commonly subangular to rounded carbonates, granites and foliated metamorphic rock types. (Klassen 1969: 4)

Klassen (1969: 3-4) suggests that this formation occurs in preglacial valleys as discontinuous patches along the valley sides and as discontinuous "shoe string" deposits in the valley bottoms. Along the preglacial valley bottoms it usually underlies at least 60 meters of glacial drift, but in some localities it underlies only 2 to 3 meters of alluvium and is exposed by river action in the Souris gravel pit near the town of Souris.

The superficial resemblance of some of the petrified or agatized wood to Knife River flint has created confusion. Hlady (1965b) identified the dark brown materials from the Souris gravel pit as Knife River flint. Clayton, et al (1970), in their definitive work on Knife River flint, made reference to Hlady's (1965b) identification. Leonoff (1970) likewise identified the Souris gravel pit as a source of

Knife River flint.

I have examined samples from the Souris gravel pit and viewed what I consider to be both Souris agatized wood and Knife River flint tools and debris from various sites and collections. Macroscopically, there appear to be several differences. The Souris materials lack lustre. They tend to break along flat planes (the tree rings) and shatter. As Leonoff (1970: 24) has illustrated, redeposited materials tend to shatter because of stress lines. Efforts by Robson Bonnichsen (personal communication) to knap a small sample of materials from the Souris gravel pit resulted in total failure because the materials shattered when struck. The Souris materials are generally represented by small pebbles only a few inches in maximum length.

The issue of whether the Souris gravel pit was an important source of Knife River flint was directed to Dr. Lee Clayton. Clayton replied:

> I spent about 30 minutes in a Souris gravel pit near Brandon last summer and couldn't find a single pebble of Knife River flint. I don't doubt that some Souris gravel does contain a few pebbles of Knife River flint derived from the Knife River valley. However, I don't think it is possible that it could be abundant enough to be quarried . . . I agree with you that the bulk of the Souris gravel is so different from Knife River flint that little would be accomplished by making thin sections of the material. (Clayton 1971: personal communication)

Although the Souris Gravel and Sand Formation is not a significant source of Knife River flint, it may contain small amounts of chert, agate, petrified wood, argillite, and quartzite. However, since all this material has a tendency to shatter along stress lines, it is unlikely to have been utilized extensively.

Chert was also used as a lithic material. The term has been used by archaeologists to categorize any material that is fine-grained, breaks with a conchoidal fracture, and exhibits a variety of colours. This broad category includes several varieties: Cat-head chert, Selkirk chert, arenaceous chert, and Bakers Narrows chert (Leonoff 1970). Cat-head chert is a limestone chert derived from the Cat-head Member of the Red River Formation of Ordovician dolostone and is exposed as outcrops along the west shore of Lake Winnipeg (Leonoff 1970: 25-26). Selkirk chert comes from the Selkirk Member of the Red River Formation of Ordovician dolimitic limestone along the Red River between Winnipeg and Selkirk and along the shores of Lake Winnipeg (Leonoff 1970: 27-28). In describing Bakers Narrows chert, Leonoff (1970: 13) combines a dull, whitish limestone chert, a dark banded material, and a "greenstone" under the one term; they were found at one site north of Lake Manitoba and no reference was made to the sources.

Arenaceous chert is a hard, medium to coarse textured material with subconchoidal fracture and a colour range from red to pale brownish-red to grey. No source is given. Two of these cherts can be assigned to outcrops where quarrying could have taken place and the other two require further research.

The granites, schists, and gneisses occur in bedrock outcroppings in the eastern portion of the province and in glacial till in the western portion of the province. They can be located in the river channels in the latter area.

A number of raw materials that were mentioned earlier are not local and must be imported. The most important of these in terms of quantity is Knife River flint (brown chalcedony). It was quarried in western North Dakota particularly in Mercer and Dunn counties (Clayton, et al 1970). The distance from the quarries to the research area is less than 100 miles. The various mechanisms of moving the materials from western North Dakota to Southwestern Manitoba could include trade or visits to the quarry area. At present, we can say only that the material was being quarried, transported in "trade blocks", of which at least one cache has been found, and used extensively in the southern portions of the province, particularly Southwestern Manitoba.

Catlinite was the main material for pipes and smoking tubes. It was probably obtained from Minnesota sources although none of the materials has been tested to prove this assumption.

Obsidian and Jadeite have been found. Obsidian is rare and probably comes from west of the Rocky Mountains. It was not available in sufficient quantities to result in debris being left in the sites. The jadeite is represented by one imported tool, an adze of a West Coast design.

Abundant amounts of certain lithic raw materials such as Swan River chert and the coarse granitic rocks were available on a seasonal basis along the river banks and outcrops of boulders in boulder till. The only possible local bedrock source for sandstone was Turtle Mountain. Some materials of superior flaking qualities such as Knife River flint were imported in large amounts; others such as obsidian and catlinite appear to be exotic items traded into the region. The presence of small quanities of Cat-head chert or Selkirk chert could represent either imported materials or small samples found locally in the glacial till.

Clay Resources

Clays are the main materials for pottery. They occur in a variety of textures and compositions throughout Manitoba. Clays can be obtained only during spring, summer, and autumn when they are not frozen and covered with snow.

Seasonal Resource Potential

In order to assess the resource potential of a particular region, it is necessary to use a Multi-Zonal Resource Potential (MRP) Model to compare its potential against the potential of near-by areas. Since the early historical groups who occupied Southwestern Manitoba utilized the Boreal Forest, Plains Grasslands, and ecotones such as the Aspen Parkland, it is necessary to compare the potential of these three biomes (Figure 7).

Southwestern Manitoba included Aspen Parkland and Grassland with forested rivers and uplands. It was most similar to the Aspen Parkland with the exception of the southwestern portion which was part of the vast expanse of Grassland extending south and west.

Spring

During the spring, the Aspen Parkland had the highest resource potential of the three zones with concentrations of bison, birds and spawning fish. The bison moved into the more open portions of the Aspen Parkland and the adjacent Grasslands on their gradual trek toward the Missouri Coteau. The nesting water birds, particularly the ducks, arrived in vast numbers and settled on the marshes, lakes, and streams. The larger migratory water birds such as the geese stopped on the marshes, lakes, and streams in large flocks too. Fish accumulated in vast shoals to spawn either in the rivers that enter the major lakes or in the shallow bays of the lakes.

In addition to these intensive resources, the Aspen Parkland was inhabited by a variety of animals that were scattered throughout the zone as more diffuse

SCHEMATIC PRESENTATION OF SEASONALLY SHIFTING RESOURCE POTENTIAL FOR THE VEGETATION ZONES WITHIN AND NEAR SOUTHWESTERN MANITOBA RESEARCH REGION

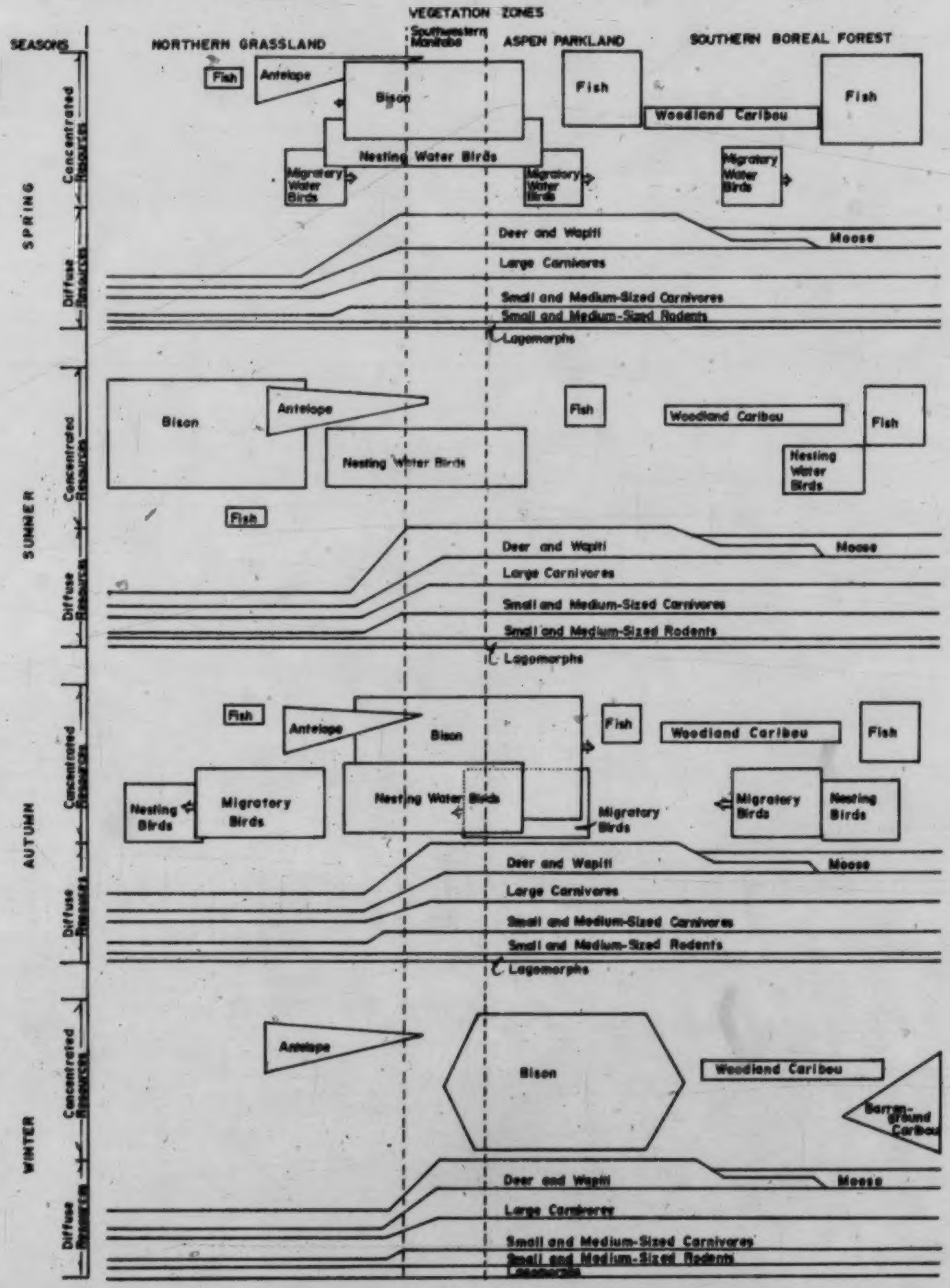

VEGETATION ZONES
SEASONS
NORTHERN GRASSLAND
Southwestern Manitoba
ASPEN PARKLAND
SOUTHERN BOREAL FOREST
SPRING
SUMMER
AUTUMN
WINTER
Concentrated Resources
Diffuse Resources
Fish
Antelope
Bison
Nesting Water Birds
Migratory Water Birds
Woodland Caribou
Deer and Wapiti
Moose
Large Carnivores
Small and Medium-Sized Carnivores
Small and Medium-Sized Rodents
Lagomorphs
Nesting Birds
Migratory Birds
Barren-Ground Caribou

Figure 7. Schematic Presentation of Seasonally Shifting Resource Potential for the Vegetation Zones within and near the Southwestern Manitoba Research Region.

resources:

a) the lagomorphs,

b) small and medium-sized rodents such as muskrat, beaver, and porcupine,

c) small amd medium-sized carnivores such as the weasel and its relatives, the coyote, fox, skunk, otter, bobcat, and raccoon,

d) large carnivores such as the bear and cougar, and

e) the large artiodactyls, the deer and elk.

Small numbers of pronghorn antelope shifted from the wooded uplands and valleys but their numbers are not known.

The southern portions of the Boreal Forest had only the migratory water birds, spawning fish, and Woodland caribou as concentrated resources. The fish resources were much higher than in the Aspen Parkland because there were more species and there were more lakes and rivers. The caribou clustered into larger groups briefly before calving.

The diffuse resources of the Boreal Forest were similar to the Aspen Parkland except for the absence of elk and rarity of deer. The large carnivores such as the black bear were likely to be more numerous.

The Boreal Forest lacked any large, concentrated resource such as the bison. The diffusely distributed small and medium-sized animals were more important within the Boreal Forest than within the Aspen Parkland.

The Northern Grassland had a lower potential than either the Aspen Parkland or the Boreal Forest in the spring. The migrating bison, the nesting and migratory waterfowl, and the antelope were the potentially intensive resources. Fish were fewer in numbers and species. The small and medium-sized rodents and carnivores were confined to the river valleys and forested uplands with the exceptions of predators such as wolves and foxes. Edge browsers such as wapiti and deer were confined to the edges of river valleys and wooded uplands and were fewer in numbers than in the Aspen Parkland. The bison gradually increased the resource potential of Grassland as they shifted to the Plains by late spring.

The research region had a potential that most closely resembled the Aspen Parkland Zone since most of it was covered with Aspen Parkland, numerous forested valleys leaving the Aspen Parkland, and the forested uplands. The bison herds travelled through the region on their migration from the Cheyenne and Red rivers to the Missouri Coteau and local herds moved onto the open Grasslands.

The nesting and migratory water birds settled on the large lakes, i.e., Oak Lake and Whitewater Lake, marshes, potholes, and rivers. The antelope moved from the forested uplands such as the Brandon Hills into the Souris Basin (Seton 1909; Wrigley 1974). Most of the fish found in the Souris River spawned in the river floodplains or shallows from April to June.

The diffuse resources of the Aspen Parkland were also available. The deer and elk were found in the valleys, wooded uplands, groves around the permanent potholes and shifting to the open grazing spaces along the edges of the wooded portions. Large carnivores such as grizzly and black bears came out of hibernation. The cougar, while present, did not appear to be common. Small and medium-sized carnivores and rodents were distributed throughout much of the region. Numerous tributaries of the Souris River and streams of Turtle Mountain were dammed by the beavers. The numerous marshes of the Souris Plain and Reston-Tilston Parkland provided the ideal, shallow water bodies for muskrats. The lagomorphs, terrestrial birds, and predacious birds were present but unlikely to have been major resource contributors.

Summer

In the Aspen Parkland, the intensive resources were reduced. The bison were now on the Grasslands to the West, the migratory water birds continued northward, and the fish were dispersed throughout the lakes and rivers. Nesting water birds and groups of antelope remained the only intensive resources. The same diffuse species of the spring were still found.

The Boreal Forest resource potential was also lower. The fish were dispersed and the migratory water fowl had left. The same diffuse resources occurred. The fish resources were greater than for the Aspen Parkland due to the increased number of species and available habitats.

The Grassland had the highest resource potential of the three zones with the accumulation of the vast herds of bison, antelope, and nesting water birds in the "wetlands" portions. Fish were insignificant as are most of the diffuse resources.

Autumn

Autumn was the season of maximum resource potential for the Aspen Parkland and for Southwestern Manitoba. All species increased their potential by means of the addition of juveniles that have been growing throughout the summer.

Among the resource intensive species, the bison were returning to their winter habitat. The nesting water birds gathered in large flocks and the migratory water birds stopped in vast numbers. The total sample of water birds numbered in the millions. The antelope migrated towards the mixed woods-grasslands of the uplands. The fish remained dispersed.

Among the diffuse resources, the small, medium, and large rodents, carnivores, and artiodactyls existed throughout the forest edges in greater numbers. The lagomorphs were scattered throughout the environment.

The potential of the Boreal Forest was increased by the flocking of the migratory and nesting water fowl. The resources were, however, insignificant compared to the resources of the Aspen Parkland and much of the research region.

The Grassland potential dropped dramatically as the vast bison herds migrated towards the Aspen Parkland where they broke up into small herds. Sheltered river valleys and uplands supported localized herds but the majority of the animals left the zone. Migratory and nesting water fowl briefly provided a concentrated resource.

Winter

Dramatic changes took place in the potential of all zones. The migratory and nesting water fowl left. The fish were inaccessible. The Aspen Parkland had the highest resource potential with the herds of bison scattered throughout the forested areas. The diffuse resources remained diffusely distributed but were located in more sheltered areas. The deer and wapiti yarded in small groups. Some of the fur bearers hibernated, e.g., bears.

The Boreal Forest, in contrast, was bleak. The Woodland caribou and moose were the only large-sized resources available. The latter became even more diffuse as it moved from lacustrine to coniferous habitats. The northern parts of the Boreal Forest had mobile, intense resources when the Barrenground caribou migrated along the frozen rivers and eskers into the Boreal Forest but the southern parts of the Boreal Forest were rarely influenced by this resource (Kelsell 1968).

The resources of the Grasslands were confined to forested river valleys and uplands. These resources were, by necessity, diffuse.

The important non-organic resources, clay and stone, were affected by winter in all zones as well. These materials froze and became covered with snow and/or ice.

In the research region, animal resources were confined to sheltered areas such as the Aspen Parkland along the eastern and northern portions, the river valleys, and Turtle Mountain. The Grasslands of the southwestern portion were void of game as the snow drifts accumulated and the cold winds swept unimpeded across the open spaces.

The Aspen Parkland had a higher resource potential than the Boreal Forest throughout the year. It also had a higher resource potential than the Grasslands during the autumn, winter, and spring but had a lower resource potential during the summer.

The resources of the Aspen Parkland and Boreal Forest were highest during the spring and autumn with the latter season having the greater potential. During these seasons there were optimum numbers of resource intensive species in addition to the diffuse resources. The resources of the Grasslands were highest during the summer, lower during the spring and autumn, and minimal during the winter.

Southwestern Manitoba shared the same resource fluctuations as the Aspen Parkland. It had its highest resource potential during the autumn and spring and least during the summer. The western Grassland portion had little potential during the winter but the eastern portion enjoyed the same relatively high potential as the Aspen Parkland Zone.

Clearly, the first postulate is demonstrated.

Postulate 1

> The importance of the physical environment of a region can be understood only by comparing the resource potential of the region during any season against the resource potential of adjacent zones or areas.

The resources vacillated seasonally within the region. The relative resource potential of the biophysical environment changed with respect to near-by areas, e.g., the shifting of the bison herds onto the Grasslands during the summer reverses the relative resource potential of the Aspen Parkland and research region to the Grassland.

Short-term Multi-seasonal Successional Changes in Vegetation Zones

The plant communities have been described as if they were static, homogeneous units. In fact, there was likely to be considerable variability due to ecological succession; i.e., ". . . the orderly and progressive replacement of one community by another until a relatively stable community occupies the area" (Knight 1965: 127). As a result, there was likely to be a series of temporary communities known as seral stages.

The causes of ecological succession during the pre-industrial period included fire, grazing and browsing by animals, cultivation (in areas where horticulture was practised), as well as a variety of climatic variables such as wind ablation and flooding. Seral stages are often treated as a series of distinct steps but the change was ". . . gradual, continuous, often variable, and in part controlled by the community itself. Stages can be skipped, telescoped, or extended" (Knight 1965: 137).

The variability created by ecological succession in the Aspen Parkland and Boreal Forest had important implications for increased plant and animal variability which, in turn, increased the potential for utilization by man.

Aspen Parkland

In the Aspen Parkland, plant succession tended toward a forest climax (Bird 1961: 24). As sloughs dried up during drier periods, the pond weeds were invaded by emergents such as bulrush, cattail, reed grass, and whitetop, which were in turn invaded by willow and aspen poplar with an undergrowth of snowberry, and the aspen poplar expanded on the prairie side by sending out suckers (Bird 1961: 25). Wetter years increased the water levels, drowned the encroaching plants, and reverted the sloughs to pondweeds and shoreline emergents. The oscillations changed the quantity of water, the area covered by trees, and the carrying capacity with respect to the quantity and variety of animals that relied upon these various plants.

Aspen tended to replace grassland when there was sufficient moisture and fires were infrequent. This trend was both hindered and aided by grazing and browsing animals. When bison overgrazed the grass and churned up the land surface while wallowing, they helped snowberry, wolf willow and aspen to extend into areas covered with grasses. On the other hand, browsing animals trampled and destroyed entire groves of trees and shrubs around a water hole.

Fire was one of the most important variables in the balance between grassland

and forest in the Aspen Parkland. Frequent fires reduced the size of the brush-forest groves and enabled the early successional grass stage to persist. Prairie fires were often large (covering a couple of hundred square miles), very common, and the result of both lightning and human activities (Arthur 1974: 22-30). Prolonged dry periods increased the expansion of grassland over forest in the Aspen Parkland by reducing the number and size of pot-holes and sloughs and the number of groves, and by causing the edge of the forest to be replaced by shrubs and grasses.

Boreal Forest

The climax trend in the Boreal Forest was toward dense stands of coniferous trees. Feit (1969: 65-67) argues that as the Boreal Forest reached maturity, the ability of spruce and fir to regenerate themselves was reduced almost to nil, the quality of the trees produced was poor, and the forest floor became strewn with undecomposed, fire-hazardous refuse. A combination of poor quality, fire-vulnerable trees, the presence of the spruce budworm, various diseases, and the occurrence of lightning and man-made fires resulted in 200-340 year cycles of forest fires (Feit 1969: 67-80).

The vast burned-over areas, sometimes tens of thousands of square miles, then proceeded to develop through "stages" towards the climax state in regular cycles (Feit 1969: 80-83). The succession for the Mistassini region is as follows:

> Fireweed (Epilobium angustifolium) first covers the burned area. It is soon invaded by blueberries (Vaccinium) and raspberries (Rubus idaeus), while white birch, aspen (Populus tremuloides), cherries (Prunus pensylvanica) and dwarf maple (Acer spicatum) are the first trees to reforest the burn. The first two species are abundant and occasionally form pure stands in the unshaded burns of ten to twenty years. They are then joined by the spruces and fir

> which grow in the shade of the deciduous trees and soon overtake them. (Feit 1969: 43).

The reforestation cycle in more southerly parts of the Boreal Forest was similar. Within the first year of the burn, less than half of the burned-over area was inhabited by vegetation; the vegetation consisted initially of ferns, fungus, grasses and sedges and later herbs and sedges which were markedly different from the ground covering in the forested parts (Feit 1969: 86-89). Within two to seven years, depending upon latitude, these grass and herb stages were likely to be replaced by shrubs, then by deciduous trees, and finally by evergreens.

The fires devastated the animal populations caught within the burned-over areas and these areas provided little sustenance during the subsequent few years, particularly the first winter (Feit 1969: 88-91). Once the successional vegetation stages began, the variability of food resources in areas at various stages of regrowth provided an environmental variability that was necessary for the survival of many of the animals occupying the Boreal Forest.

Long-term Palaeoenvironmental Changes

Two major models have been used by Plains archaeologists for interpreting past climatic episodes:

a) a model of gradual climatic change, and

b) a model of sudden climatic shifts.

Antevs (1955) presented a model of a gradual post-glacial warming trend that climaxed with the Altithermal about six thousand years ago. Antevs' data were based primarily on soil erosion and redeposition in the Great Basin, and its applicability elsewhere must be demonstrated locally.

Recent palynological investigations in the Glacial Lake Agassiz basin indicate four major vegetation intervals over the last 12,000 years with a brief period of maximum aridity ca. 7-8000 years ago (Shay 1967; Ritchie 1967, 1969). These changes appear to be the result of gradual climatic oscillations. The latest vegetation interval in the southern Glacial Lake Agassiz basin is summarized as follows:

> Shortly before 4,000 years ago climatic conditions apparently became favorable for the increase of deciduous forest elements including birch, elm, *Populus*, ash, ironwood, basswood, and later sugar maple. These deciduous forests were concentrated on the eastern uplands and occurred only in moist situations around lakes and along streams on the Agassiz lowlands and on the Prairie Coteau. Oak persisted in the eastern area and at the forest margins and gradually expanded along with *Populus* and birch culminating in the present mosaic of oak savanna, aspen parkland, and xeric forest. These deciduous forests in the present pine-hardwoods area were invaded about 2,700 years ago by white pine. Jack pine and red pine expanded into the same area about 1,000 years ago.
> (Shay 1967: 251)

In contrast to this cautious model of gradual change is a model of short episodes of environmental stability caused by rapid climatic shifts. This latter model has become synonymous with Reid Bryson, one of its foremost advocates (Bryson and Wendland 1967; Bryson et al 1970). The terminology of the Danish Blytt-Serhander system for continental Europe is transposed to North America.

Bryson and his colleagues state that there is a need to shift from interpreting periods as "warmer", "wetter", "drier", to interpreting climatic changes taking place at global, continental, and regional levels. They attempt to demonstrate a correlation between certain climatic variables such as air masses and fronts with major biotic regions, but warn that their data are based upon inadequate research and is possibly premature (Bryson and Wendland 1967). They assume that climate is the ultimate environmental control, that certain climatic changes such as a shift in the westerly winds will have global repercussions, and that these repercussions can be interpreted using modern analogs. They further assume that ". . . the duration of the transition from one quasi-stable climatic state to another should be appreciably shorter than the length of a climatic episode" (Bryson et al 1970: 62-63).

After submitting a large sample of carbon-14 dates, which had been interpreted as representing periods of change, to a computerized manipulation, Bryson and his colleagues believe that the results substantiated the time periods assigned to the various climatic episodes of the Blytt-Sernander system (Bryson et al 1970: 53-56). Furthermore, they believe that the climatic change associated with one of their episodes can be used to account for changes in prehistoric complexes in Wisconsin and the Texas panhandle.

The time period of concern is approximately the last 2,500 years. Seven episodes have been assigned to this period (Table 1). It has been emphasized that these episodes represent minor perturbations in climate and floral communities rather than major changes (Bryson and Wendland 1967: 292). In general "the vegetation should have a general Sub-Atlantic character through the last two millennia . . . and changes should be sought primarily in minor aspects of the floristic communities except in the vicinity of sharp ecotones" (Bryson and Wendland 1967: 28). The minor climatic oscillations would have had impacts only on the boundaries of biotic regions--the ecotones--while the core areas would have remained unchanged.

The presence of the research region on the border of the Grassland Biome and

TABLE 1

THE BRYSON-BAERREIS-WENDLAND METEOROLOGICAL MODEL
AND COMPARATIVE PALAEOENVIROMMENTAL DATA

Time	Model of Climatic Episodes (Baerreis-Bryson-Wendland)	Dune Stabilization (David 1971)	Tiger Hills Palynology (Ritchie & Lichti-Federovich 1968)	Riding Mountain Palynology (Ritchie 1969)
2000				
1900	Modern		Zone I Modern	
1800	Neo-Boreal "Little Ice Age" Colder Reduced growing season		Zone II	Zone III
1700				
1600				
1500	Pacific I & II Cooler and drier Westerlies Plains spread eastward	GSC-1091		
1400				
1300				
1200	Neo-Atlantic "Little climatic optimum" Boreal forests expand More moisture Plains agriculture			
1100				
1000		GSC-954		
900				
800	Scandic Climatic amelicration Boreal forests extend northward			Little
700				recorded
600				change
500				throughout
400	Sub-Atlantic Severe climate Upland muskeg growth Wetter summers Stormier winters	GSC-953		this
300				zone
200			Expansion	
100				
0			of	
100				Sudden
200		GSC-950		southward
300			Oak	spread
400				of
500				Boreal
600			Savanna	Forest

Aspen Parkland Ecotone makes it potentially vulnerable to these climatic variations. Furthermore, the people who utilized this region may have been affected by changing subsistence potential in other regions due to these environmental changes.

The following descriptions of episodes are synthesized from Baerreis and Bryson (1965) and Bryson and Wendland (1967):

Sub-Atlantic Episode (550 B.C. - 400 A.D.). In general this episode was more severe than modern climatic conditions. The Boreal Forest was distributed according to the current pattern but the climate was wetter, resulting in the initiation of upland muskeg growth in central Canada. Summers were wetter across the Northern Plains and Minnesota with white pine becoming more common in the latter area. The nature of the winter is not clear, but it may have been stormier.

Scandic Episode (400 A.D. - 800 or 900 A.D.). Climatic amelioration and glacial retreat was characteristic. Conditions returned to those of the Atlantic Episode in which there was more cloudiness or heavier snowfall and a northern migration of the edges of the Boreal Forest.

Neo-Atlantic Episode (800 or 900 A.D. - 1250 A.D.). Arctic drift-ice and mountain glaciers were reduced. The interior of Canada was warmer with the Boreal Forest extending north into what is now tundra and south into the Aspen Parkland. Moist tropical air masses extended farther inland, producing abundant summer rains, and the dry westerlies were weaker. Farming expanded both in the American Southwest and the Plains. The distribution of the tall-grass Prairies shifted westward. A strip along the present forest-prairie ecotone of northwestern Minnesota and southern Wisconsin became drier.

Pacific I and II Episodes (1250 A.D. - 1550 A.D.). The wet, tropical currents were reduced and the dry westerlies became more extensive in an abrupt climatic change. Northerly climates became cooler and ice conditions were worse in the sub-Arctic. Summer rains diminished and the prairie peninsula extended farther eastward across Illinois and Indiana. The northern outposts of the Middle Mississippi peoples in Wisconsin and Minnesota may have been abandoned. Antelope became more important in the Western Dakotas and bison became more important than deer in the diet of the Mill Creek people in Northwestern Iowa. Increased aridity in Nebraska forced groups to shift to the Texas panhandle region.

Neo-Boreal Episode (1550 A.D. - 1850 A.D.). This period has been referred to as the Little Ice Age and was accompanied by southward extensions of the arctic air mass and increased development of both continental and mountain glaciers. Summers were cool and autumns were about 4° C. cooler. Severe weather was probable in the Canadian Arctic, and the Upper Mid-West had shorter growing seasons.

Recent (1850 A.D. - 1940 A.D.). Recent climatic amelioration began about 1880.

This sequence of episodes provides a tentative model of changing climatic and plant communities which has been used to account for the appearance of the oldest known village tradition, the Initial Variant of the Middle Missouri Tradition, in the Middle Missouri Valley (Lehmer 1970: 118-121), and the shift in subsistence of Mill Creek peoples in Iowa (Bryson et al 1970: 64-67) during the period A.D. 900 - 1200. Given the general paucity of dates and excavated sites as well as the range of variation of any given date, correlations between sudden changes in subsistence and sudden changes in environment must be viewed with caution.

No palaeoenvironmental data are available from Southwestern Manitoba with which to determine precise environmental changes. Data from near-by regions on palynology (Ritchie 1969; Ritchie and Lichti-Federovich 1968), ostracods (Delorme 1971) and stabilized sand-dunes (David 1971 provide information on general change (Table 1).

Ritchie (1969: 1348-1349) indicates that a pollen core from Riding Mountain to the north of the research region substantiates Bryson and Wendland's general hypotheses on climatic change; however, Zone IV includes the entire period from greater than 2,500 years ago to the historic period. Ritchie identifies a major biotic shift *circa* 2,500 years ago when the Boreal Forest shifted southward and enveloped Riding Mountain.

Palynological studies in the Tiger Hills to the northeast of the research region identified a single Zone II incorporating the 2,500 years prior to the historic period (Ritchie and Lichti-Federovich 1968). The beginning of Zone II, which equates approximately with the beginning of the Sub-Atlantic, was marked by a shift from grassland-dominated landscape or parkland to an oak savanna.

Other palaeoenvironmental data suggest that these broad, palynological zones do not adequately reflect the degree of change that occurred. A series of environmental changes in the Tiger Hills were reconstructed, using ostracods (Delorme 1971); he found recent changes from parkland to deciduous forest to grassland to mixed boreal forest to deciduous forest to historic parkland vegetation were indicated but these changes could not be controlled temporally.

David (1971) studied a series of buried paleosols in sand dunes at Brookdale, northeast of the research region which indicate that a major period of dune activity occurred sometime prior to 2,500 years ago but was terminated by the humid Sub-Atlantic Episode. At approximately A.D. 430, 1030, and 1520 periods of increased moisture and dune stabilization occurred with intermittent periods of dryness with dune erosion.

The evidence from ostracods and paleosols indicate considerable climatic variability. Further research with tighter temporal controls will provide better evidence on the degree to which local vegetation and biotic resources were altered and how these alterations influenced utilization of the region by various human groups.

By beginning with the resource potential, it is possible to develop a baseline against which ethnohistoric and archaeological data can be evaluated. The synchronic seasonal construction for the early historic period indicates considerable vacillation within Southwestern Manitoba on a seasonal basis and shifting in importance between zones. Groups who occupy a particular region have, theoretically, the options of:

a) adapting to different resource potential from season to season, provided that the resource potential does not drop below a survival level,

b) moving across zones to utilize the most readily available resources,

c) trading resources across zones, or

d) some combination of these alternatives.

The ethnohistoric subsistence-settlement systems described in Chapter 3 indicate that multiple-zone resource utilization was the norm.

Some resources such as water fowl provided a high resource potential and were important for ethnohistoric groups but do not appear frequently in the archaeological record. Such discrepancies between the biophysical resource potential and archaeological materials provide insights for alternative hypotheses of resource utilization by prehistoric groups and/or research requirements by archaeologists.

CHAPTER 3

THE SOCIAL ENVIRONMENT

Introduction

In a discussion of the social environment, one must include all groups who occupied the research region on either a full-time or seasonal basis plus those groups from outside the region who may have affected the groups living in the region through economic or social interaction. Ray (1971), for example, has indicated that the Assiniboin visited the Mandans during the autumn to exchange meat and buffalo hides for horticultural produce. This specific activity should be reflected in the settlement distribution of the Assiniboin and possibly in technological traits such as trade items and diffusion of ideas. Previous efforts to identify the ethnic groups who occupied the various biomes of southern Manitoba have been cursory. Vickers (1945, 1946, 1948b) reported Hidatsa, Assiniboin, Saulteaux, Cree, Gros Ventre, and Sioux peoples in the province. However, more recent efforts to relate archaeological materials to ethnic groups included only the Assiniboin and Cree in southern and eastern Manitoba (MacNeish 1954, 1958; MacNeish and Capes 1958; Hlady 1971; Mayer-Oakes 1971).

The development of a Stacked Chronological Model for Manitoba archaeology has resulted in the development of a distorted model of the ethnohistoric record. The Assiniboin were identified as the only inhabitants of southeastern and southwestern Manitoba for the period A.D. 1000 - 1350 after which they were replaced by the Cree in eastern Manitoba during the period A.D. 1350 - 1750 (MacNeish 1954, 1958). MacNeish's model assumes that ethnohistoric occupations occurred sequentially and that any one biome was occupied by only one group during any time period.

This model remains the basic framework for subsequent archaeological interpretations. Two minor modifications are that:

a) the Assiniboin may have entered southern Manitoba via two migrations in the Seventeenth and Eighteenth centuries (Capes 1963: 116-118), and

b) the Assiniboin persisted along the Red River of southeastern Manitoba until 1850 (Hlady 1970b).

In order to apply the Co-Influence Sphere Model to the ethnohistoric and archaeological data of Southwestern Manitoba the ethnohistoric data are reassessed in terms of the identification of all groups who inhabited Southwestern Manitoba and near-by areas and the economic importance of Southwestern Manitoba in the overall subsistence settlement cycle of the groups.

The following data indicate:

a) there was much greater Native ethnic diversity within and near the research region than has been previously recognized,

b) the mobility and territorial range of various Native ethnic groups has been consistently underrated,

c) most groups can not be affiliated with a single biome, i.e., most groups moved from one biome to another on at least a seasonal basis and those groups that tended to remain in one vegetation zone developed trade networks with peoples living in other zones,

d) subsistence-settlement distributions were determined in part, by the need to adapt to variable resource potential by utilizing multiple resource zones and/or developing social networks for resource redistribution.

Traditional Mobility and Distribution Range

Postulate 2:

> Native groups following a primarily traditional subsistence-settlement orientation were highly mobile and utilized two or more environments as core, secondary, and tertiary areas of intensity.

Basic to an understanding of the historical social environment and to the prehistoric social environment is an appreciation of the traditional mobility of the Native peoples. Reasons for widespread movement included:

a) utilization of several environments for different resources on a seasonal basis,

b) shifting from area to area due to intertribal conflict,

c) inter-tribal conflict, and

d) trading with other groups.

Many groups relied upon resources from different environments. The Assiniboin of the Eighteenth Century utilized both the Plains and the Aspen Parkland because the bison migrated across these zones. Likewise, the Middle Dakota shifted from Woodland to Oak Savanna to eastern Plains on a seasonal basis in order to utilize a variety of resource intensive foods. The Cree living along the southwestern edges of the Boreal Forest shifted to the Aspen Parkland during the winter in order to hunt bison; during warm winters they were obliged to shift to the edges of Plains because the animals were not forced to seek the shelter of the wooded areas. Even among sedentary groups such as the Mandan and Hidatsa, groups ranged as far east as extreme westerly North Dakota for eagles and as far north as Southwestern Manitoba for bison during various seasons.

Inter-tribal conflict and trading also resulted in widespread movements of at least small parties of many groups. The Assiniboin, for example, who occupied Southwestern Manitoba at the end of the Seventeenth Century were trading at York Factory on the Hudson Bay and acting as guides for fur traders such as Henry Kelsey who went inland along the Saskatchewan River (Whillans 1955). In addition, they traded with the riverine horticulturalists along the Missouri River in present day North Dakota during the fall and raided Dakota villages in Minnesota in the spring (Haxo 1941; Ray 1971). Not only did individual bands range over these vast areas, but they also demonstrated considerable knowledge of the area, including an awareness of being in enemy territory, e.g., an uneasiness when in Blackfoot country with Henry Kelsey (Whillans 1955).

The Crow were another group that appeared to have traversed vast regions of the northern Plains plus areas outside of the Plains. The Crow, who were once part of the Hidatsa tribe, adopted a nomadic, bison-hunting orientation. Byrne (1973: 532-533) cites references to some of the Crow being on the Saskatchewan River and visiting, at least once in 1716, York Factory on the Hudson Bay, despite the fact that southern Montana was their homeland. Other evidence of Crow mobility was reflected in their activities as middle men between the Middle Missouri trade centres of the Mandan, Hidatsa and Arikara on one hand and the Shoshone rendezvous which probably took place in southwestern Wyoming (Ewers 1968; Wood 1972: 157-160).

Movement due to intertribal warfare has been recorded for many groups during the historic period. The oral traditions of the Cheyenne indicate that they were driven from the eastern Woodlands (Hoebel 1960: 1-2). The conflicts between the Assiniboin and the Dakota, between the Dakota and the Chippewa, among most of the groups living south of the Great Lakes, between the Cree and the Blackfoot tribes, and between the Piegan and the Kutenai, indicate frequent displacement of groups and shifting territories due to intertribal conflicts. In addition to the above mentioned conflicts, intra-tribal conflicts have resulted in tribal fission and the subsequent creation of new ethnic groups with their own territory. Examples of such fissions include the Assiniboin from the Yanktonai (Howard 1966 II), the Gros Ventre from the Arapaho (Flannery 1953), the Arikara from the Pawnee (Grinnell 1961; Deetz 1965: 5-37) and the Crow from the Hidatsa (Bowers 1965).

Ethnographies and general texts frequently portray the distributions of various ethnic groups on maps as static groups with adjacent, non-overlapping boundaries (Jenness 1967; Driver 1961; Underhill 1971). The realities of adaptation to variable resources and a variety of patterns of interaction of various groups require that the social environment, in a synchronic perspective, be viewed as a series of overlapping territories. In a diachronic perspective, the social environment must be viewed as a series of shifting seasonal distributions plus a series of shifting long-term areal distributions. In the Southwestern Manitoba Region, during the mid-Eighteenth Century, there was a complex pattern of several groups utilizing the same area according to more than one seasonal pattern. The Assiniboin were using the region as a whole during most of the year but the seasonal distribution shifted in response to different resource accessibility. Several groups with different resource interests, technology, and social organization utilized the region seasonally; some tribes such as the Sioux and Hidatsa utilized the grassland part of the region during the late fall while others such as the Cree utilized the Aspen Parkland during the winter.

The distribution of a group must be analyzed as the total area occupied by the group in all of its activities associated with subsistence in all seasons, trading, and conflict. The distribution of seasonal forays by small groups involved with hunting, raiding, or trading in secondary or tertiary areas is as important in defining distribution as locating the core or homeland of a group since evidence of occupations and/or trade items must be accounted. Also, changes in the utilization of these secondary and tertiary areas may have important implications for understanding inter-tribal relationships.

When data are derived from ethnohistoric literature, it must be assessed for the degree to which it reflects traditional Native activities versus activities modified by the fur trade. There has been an unfortunate trend to over emphasize the effect of European contact upon Native groups and to create impressions either that Native groups lived in some Rousseauian idyll which was suddenly shattered by the appearance of European influences which created conflict and disruption, or that the ethnohistoric situation was like an unwound mechanical toy to which the presence of Europeans acted as a stimulus to start the parts moving. The archaeologist can not allow himself to be lulled into accepting this static model of behaviour. Current evidence indicates that during at least the early historic period, many Native groups continued their traditional activities with only minor changes and that fur traders adopted many of the traditional activities such as gift-giving and setting up trade centres (Wood 1972; G. Wright 1967; Ray 1974).

There is no doubt that the appearance of Europeans with their trade items and forts resulted in movements of peoples and shifts in the balance of power between groups; e.g., the Cree displaced the Chipewyan after they had access to numerous guns. But it is also evident that conflicts, changing geographical distributions, and shifting balances of power occurred before European contact. The Huron and Iroquois were in conflict before the Europeans arrived; the presence of the French merely gave the Huron a temporary advantage along the St. Lawrence valley. The development of major prehistoric centres such as the huge Mississippian centres like Cahokia, A.D. 800-1300, must be viewed as having as potentially equally disruptive influences as the Europeans during the early fur trade period. An understanding of how the recent European influences affected Native groups can provide the basis for developing models of change in prehistoric cultures.

Subsistence-Settlement Activities of Groups in and Near Southwestern Manitoba

Ethnohistoric groups identified with Southwestern Manitoba include:

a) Groups reported as occupants of Southwestern Manitoba (Table 2).

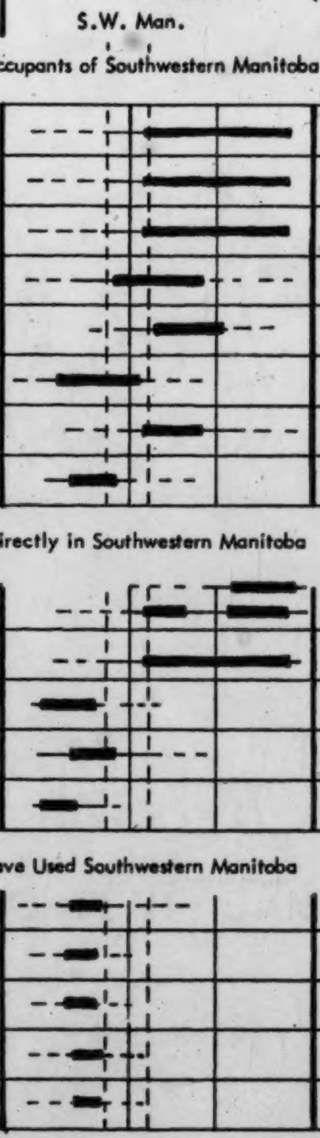
b) Groups indentified indirectly with Southwestern Manitoba.

c) Groups estimated to have utilized Southwestern Manitoba.

Within these categories are examples of ethnic groups who utilized Southwestern Manitoba as part of their core area or homeland, e.g., the Assiniboin and Plains

TABLE 2

SUBSISTENCE-SETTLEMENT PATTERNS OF NATIVE ETHNOHISTORICAL GROUPS[a] INVOLVED IN THE CULTURAL HISTORY OF SOUTHWESTERN MANITOBA



Ethnic Group	Time Period	Zonal Importance[b]			Seasonal Cycle[c]				Seasonal Occupation of S.W. Manitoba
		Grassland	Aspen Parkland	Forest	Spring	Summer	Autumn	Winter	
A. Groups Reported as Occupants of Southwestern Manitoba									
Western Cree	1000-1750				A.P. B.F.	B.F.	B.F.	A.P.	Winter
Western Ojibwa	-1750				B.F.	B.F.	B.F.	A.P.	Autumn Winter
Early Bungi	1800-1850				D.F. A.P.	A.P.	A.P.	D.F.	Spring? Autumn
Assiniboin	1600-1700				A.P.	G.	A.P.	A.P.	Spring Autumn
Yankton, Yanktonai	1700-1800's				A.P.	G.	A.P.	D.F. A.P.	Autumn
Teton	1700-1800's				G.	G.	G.	A.P.	Autumn
Plains Ojibwa	1800's				A.P.	G.	A.P.	A.P.	Spring, Autumn Winter?
Gros Ventre	late 1700's				A.P.	G.	G. A.P.	A.P.	Autumn
B. Groups Identified Indirectly in Southwestern Manitoba									
Ottawa	Mid 1700's late 1700's				A.P. G. A.P.	G.	A.P. G. A.P.	A.P. A.P.	Spring? Autumn? Summer? Autumn?
Santee	1700's				D.F. A.P.	G.	C.H.	D.F. A.P.	Spring? Autumn?
Hidatsa	1700-1800				G.	G.	G.	G.	Autumn
Plains Cree	1800's				A.P. G.	G.	G.	A.P.	Autumn
Crow	1750-1850				G.	G.			Autumn
C. Groups Inferred to Have Used Southwestern Manitoba									
Awaxawi	1700's								Autumn, Winter
Omaha	early 1700's								Autumn?
Ponca	early 1700's								Autumn?
Cheyenne	1700's								Autumn
Suhtais	1700's								Autumn

[a] Métis groups are excluded.

[b] Utilization symbols: Core ▬, Secondary —, Tertiary - - -.

[c] Zonal Symbols: A.P. - Aspen Parkland, G. - Grassland, D.F. - Deciduous Forest, B.F. - Boreal Forest, C.H. - Conifer-Hardwood Forest

Bungi; groups known to have utilized the region on a regular, secondary seasonal basis, e.g. Sioux (probably Teton, Yankton, and Yanktonai), Hidatsa; and groups who are proposed to have utilized the region on a secondary basis because they lived in proximity to the region and followed a similar subsistence-settlement to groups who did use the region, e.g., Cheyenne, Suhtais, Ponca and Omaha; or utilized the region intermittently on a tertiary basis, e.g.,Santee, Hidatsa, and Mandan. The ethnohistoric record is complex and reflects the co-existence of numerous groups on a seasonal basis.

In order to assess the possible biophysical limitations which may have influenced the utilization and settlement distribution within the research region, it is necessary to consider the adaptive subsistence orientations of the various groups who occupied the near-by vegetation zones. Specific subsistence seasonal rounds emerged within the various vegetation zones. All of these subsistence activities included seasonal movement from one vegetation zone and/or exchange systems between groups utilizing different biophysical environments.

Boreal Forest

Two major subsistence cycles were practiced by the Algonquians of the Boreal Forest:

a) a diffuse economy of groups adapted to year-round activities within the Boreal Forest, and

b) an Aspen Parkland-Boreal Forest cycle.

Groups who relied upon the Boreal Forest developed a number of adaptive strategies depending upon local resources. Cree living along the Hudson Bay

Lowlands developed a traditional coastal round of spring and summer hunting of coastal birds, shifting to nomadic movements of small family groups following a precarious winter existence based on dispersed resources such as fish, hare, and fur bearers (Bishop 1972). Farther south, in the Boreal Forest, Cree and Ojibwa groups were able to live a less precarious existence but they had to remain in small groups and had to rely upon dispersed game animals. Primary food resources were the caribou, moose,[5] bear, beaver, and fish (Rogers 1969; Feit 1969; Bishop 1972). Migratory water fowl, snowshoe hare on a cyclical basis, terrestrial game birds, medium-sized animals such as lynx, otter and porcupine, and small animals such as marten, fisher, and muskrat augmented the diet. Dogs, wolves, foxes, wolverine, ermine and animals smaller than mink were not utilized. Resources are clearly diffuse and variable.

During the summer, bands of 50-150 individuals gathered on the lakes where they relied upon moose, fish, and waterfowl (Rogers 1969). The bands divided into small, primarily kinship hunting groups of approximately 20 individuals which occupied as much as 1500 square miles (Rogers 1969: 30-34).

While a sense of territoriality was present, the boundaries of these territories undoubtedly shifted frequently in response to forest firest and resource fluctuations (Feit 1969: 126-139). A "feast or famine" cycle occurred as groups were forced to shift from region to region and resources fluctuated in response to biotic successions due to periodic forest fires. Attempting to place Cree and Ojibwa groups within static environmental regions provides severe limitations to understanding the

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[5] Evidence on the antiquity of moose in the Boreal Forest is inconclusive.

Algonquians (Fisher 1969).

A second adaptation was the Boreal Forest-Aspen Parkland subsistence-settlement of the Western Cree (Ray 1974: 35-48). This cycle existed from at least the mid 1600's until the mid 1700's. The Western Cree moved from the Boreal Forest to the Aspen Parkland during autumn when they abandoned canoes, made snowshoes, divided into hunting groups, and subsisted mainly on moose and fish, particularly pike. During the winter, they impounded bison in the southern parts of the Aspen Parkland. Sometimes they mixed with the Assiniboin, and other times remained in their own groups. In spring, they shifted to thawing rivers of the Aspen Parkland to locate stands of birch for making canoes, and moved to lakes where the spawning fish and waterfowl provided abundant resources. During the summer, the groups combined into large bands or macrobands to socialize and conduct important religious festivities. The summer resources consisted of moose, fish, water fowl, and a similar range of medium and small mammals hunted by the more easterly Algonquians. The Western Cree existed in much denser populations (Rodgers 1969); the greater population densities reflect greater resource density on a year-round basis.

Other groups who followed a similar subsistence round were the Western Ojibwa (Saulteaux or Chippewa) (Ray 1974: 101-104) and the Bungi or Plains Ojibwa during transitional stages to a Plains orientation (Howard 1965b). The Western Ojibwa existed northwest of Lake Superior. Ethnohistoric accounts are vague about the time period but the archaeological record provides evidence that the Western Saulteaux existed in the area by at least A.D. 700 (see Chapter 5). The Bungi are identified as a late off-shoot of the Saulteaux who were not recognized as a distinctive group until the late 1700's. By 1800 they were well established as a distinct ethnic group along the Red, Assiniboine, and Souris Rivers (Howard 1965b: 8).

The core area of resource utilization for the Western Algonquians included the Aspen Parkland and western parts of the Boreal and Conifer-Hardwood forests. In the Aspen Parkland, the winter camps existed in sheltered areas. In the spring, sites were primarily along the rivers; during early spring sites were located in the Aspen Parkland and in the late spring within the Boreal Forest. The spring sites in the Aspen Parkland were located near spawning grounds and lakes.

The secondary area of less intensive utilization includes the Aspen Parkland and the Northern Plains as the Cree, Ojibwa, and Bungi alternatively traded and made war on such groups as the Sioux, Mandan, and tribes of the Blackfoot Confederacy (Ray 1974; Howard 1965: 18-20, 79-89). The raids were conducted sporadically by groups of warriors during the spring and autumn when adequate food supplies were available for those who were left behind.

Tertiary or sporadic settlement were represented by occasional trips into the Grasslands during mild winters when the bison did not migrate to the Aspen Parkland. Raiding between widely separated groups (e.g., when the early Bungi fought the Blackfoot) also likely occurred infrequently.

Since these Western Algonquians spanned the Aspen Parkland and Boreal Forest zones regularly, their tool kits within each biome reflected their overall technological developments although specialized sites such as fishing stations would have contained specific tools such as harpoons, fish hooks, and net sinkers. However, since items made from cloth, skin, bark, and wood perish very rapidly, the traditional items of significance for interpreting archaeological sites are tools made from stone, clay, and bone. Even bone may not survive for long periods under adverse conditions such as acidic soils. Traditional items left at sites by the historic Western Algonquians included bone needles, awls, points for fish hooks, double pointed fish gorges, harpoons, fleshers, and beamers and stone pipes (Rodgers 1967; Howard 1965b). Prior to the fur trade, the inventory of stone tools included scrapers, knives, projectile points, whetstones, awls, and wood-working tools (Wright 1971; Dawson 1974a). Other pre-European items included ceramic vessels and copper beads and spears.

Upper Great Lakes

The Upper Great Lakes were occupied by a number of Algonquian-speaking and Siouan-speaking tribes: the central Algonquian-speaking Ojibwa, Ottawa, Menomini, Sauk, Fox, Kickapoo, Potawatomi, Mascouten, Illinois and Miami as well as the Siouian-speaking Winnebago, Santee (eastern) Sioux, Iowa, Missouri and Osage. During the Seventeenth Century, when many of these groups were first being reported by Europeans, they were in the process of displacement; however, their oral traditions give some indication of their displacement and their subsistence activities reflected their adaptive strategies that they followed in various biophysical environs. The Ojibwa, Ottawa, and Santee Sioux utilized Southwestern Manitoba.

The Upper Great Lakes area has been divided into several biotic provinces-- the Canadian Province and the transitional Canadian-Carolinian Zone (Conifer-Hardwood Zone), the Illinoian Province (Oak Savanna Zone) and the Carolinian

Province (northern parts of the Deciduous Zone) (Cleland 1966; Fitting 1966; G. Wright 1967; Fitting and Cleland 1969). The Canadian Biotic Province is identified as a transitional zone between the Hudsonian (Boreal Forest) Biotic Province to the north and the Carolinian (Deciduous) and Illinoian (Oak Savanna) Biotic Provinces (Cleland 1966: 7).

During the early historic period, each of these biotic provinces was occupied by one or more ethnic groups with environmentally specific subsistence orientations. The Canadian Biotic Province was occupied by a number of Algonquian-speaking groups. To the north and east of Lake Huron were the Algonquins (Algonkins) and Ottawa, in northern Michigan and along the north shore of Lake Superior were the Chippewa (Ojibwa), and in northern Wisconsin were the Menomini; all of these groups were hunter-gatherers in small family groups during the winter and lake shore village dwellers during the summer (Cleland 1966: 11).

A Chippewa Settlement Pattern has been defined for the Canadian Province (Fitting and Cleland 1969: 293-294). Large summer fishing and hunting villages were occupied during the summer. The sites for all other seasons consisted of small family groups occupying sites for short periods, usually located slightly inland and away from the lakes. While the above may be valid for the Chippewa among whom Alexander Henry spent the winter of 1763-64, some alternative adaptations have been presented for the Ojibwa in southern Manitoba.

The Ojibwa have also been reported as consisting of a number of semi-autonomous clan villages living along the north shore of Lake Huron, the northeast shore of Lake Superior, the area around modern Sault Ste. Marie, and the area between Lake Superior and the north shore of Lake Michigan during the early

1600's (Hickerson 1970; Kinietz 1965). During the late 1600's they were recorded in the area southwest and west of Lake Superior and it is likely that they were there earlier.

The Ojibwa followed a variety of economic activities. Those living north of Lake Superior probably lived entirely by hunting, fishing and gathering while those who lived on the western end of Lake Superior had no difficulty growing crops and followed a semi-sedentary existence in which they raised crops during the summer and spent the remainder of the year in their hunting grounds (Kinietz 1965: 321). Others who lived at Sault Ste. Marie survived primarily upon whitefish year round. Still others who lived between Lake Superior and Lake Huron planted their crops in June, dispersed to gather bark and berries and to fish for sturgeon, returned to harvest the crop and to catch whitefish, and finally spent the winter on hunting grounds hunting beaver and moose. The variability in resource utilization by these more easterly Ojibwa plus the previously mentioned western groups indicates the flexibility and adaptability that existed among them.

The term "Ottawa" has been used to refer to a variety of groups, but it is used here in the same sense as Kinietz who refers to four bands--the Kiskakons, Sinago, Ottawa of the Sable, and the Nassauketon or People of the Fork (Kinietz 1965: 226-227). The exact location of these people is difficult to determine because they had been dislocated along with their allies, the Hurons, by the Iroquois and because they were noted as major traders who travelled great distances. The Ottawa, like the Potawatomi are closely related linguistically to the Ojibwa and were part of the early Ojibwa migrations (Underhill 1971: 141). During the early contact period, 1615-1650, they occupied the shores of Lake Huron; during

1650-1700 the Ottawa were settled primarily south of Lake Superior; and during 1700-1760 settled about Detroit (Kinietz 1965: 203-231). But by the late 1700's, some Ottawa were widely distributed in areas such as eastern and northern Manitoba and were practising horticulture in the Aspen Parkland (Bryan 1969: 36; Moodie and Kaye 1969: 515-521).

The subsistence activities centered around the cultivation of corn, peas, beans and squash, fishing and hunting. During the summer, they resided in permanent villages with the women tending the gardens and the men making short hunting trips of 120 to 160 kilometres to hunt deer, bear, beaver, otter, foxes as well as fowl such as pigeons, ducks and geese and fish such as trout, whitefish and herring (Kinietz 1965: 236-241). During the winter, hunting trips were more extensive with families heading to assigned hunting territories.

Fitting and Cleland (1969: 295-296) defined an Ottawa subsistence-settlement system which they attributed to adaptation to the Canadian-Carolinian Transition Zone. The semi-sedentary Ottawa spent the summer in large horticultural villages occupied by women and old men and small hunting camps occupied by men and some women. The winter camps were similar except that the small hunting camps were occupied by 8 or 10 males and were located in pre-assigned hunting territories. Horticulture played a more important role in this more southerly transition zone.

The Ottawa were noted traders and were recorded by Champlain in 1615 as having travelled in bands more than 400-500 leagues (Kinietz 1965: 245; G. Wright 1967). They traded mats of reeds and corn husks and furs for earthen pots, woven girdles, small sea shells, and during the early historic period, beads, paints and porcelains. However, the account by Radisson of the Ottawa trading for earthen pots is the only recorded account of any Great Lakes tribes using Native pottery as a trade item.

Prior to the late 1700's, the Ottawa may have been trading in southern Manitoba. By the late 1700's at least one band of Ottawa from Michigan migrated to the Red River of eastern Manitoba and was involved in war excursions with the Ojibwa, Cree and Assiniboin against the Hidatsa of North Dakota and Atsina of the Northwestern Plains (Howard 1965b: 14-15).

After they were established in eastern Manitoba, the Ottawa developed a regular seasonal round, similar to the Bungi, as follows (Howard 1965b: 16-17):

a) Spring:

  i) small groups of a few hunters hunting beaver along the tributaries of the Red River after the ice break-up;

  ii) small family and multi-family groups sugaring at maple and box-elder groves; and

  iii) by the end of spring, the accumulation of large bands for trading, tribal religious performances such as the Midewiwan, and councils of war. During the late 1700's, the Red River valley was noted for numerous quantities of elk and bison to the west and bear, beaver, moose, and deer to the east.

b) Summer:

  i) settlements, and

  ii) large war parties often including a number of allies, raiding to the south and west. Information is incomplete on resource utilization but fishing and hunting of diffuse resources were important.

c) Autumn:

  i) small hunting parties to store elk and deer resources,

  ii) villages near the gardens being harvested, and

  iii) hunting parties after the bison

d) Winter:

  i) small family and multi-family groups scattered throughout the Aspen Parkland.

Upper Mississippi

To the west of the above mentioned Algonquian groups, in the area of the Upper Mississippi in the present states of Minnesota and Iowa, lived the Sioux or Dakota tribes and their Chiwere-speaking Siouan neighbours to the south. This area is very important for understanding prehistoric and early historic developments in Southwestern Manitoba because of its proximity and concomitant influences; because of the similar environmental situation of forest and prairie separated by parkland; because it was the homeland of the Assiniboin Indians who became residents of the research area; and because the ethnohistoric record of movements and changing environmental adaptation yields important insights into the understanding of the settlement distribution and subsistence activities of these groups who may have used part of the Southwestern Manitoba Region.

The Sioux lived west of Lake Superior when first contacted by Europeans. They may have been relatively recent occupants in the area. Accounts of early migrations are contradictory (Robinson 1904: 15-19). Recent accounts of allowing the Winnebago to take refuge among them and the conflicts with the Chippewa are well documented and post-date the mid-Seventeenth Century (Meyer 1967; Hickerson 1970).

The Sioux consisted of seven groups that have been combined into three divisions:

a) four bands of the Santee or Eastern Sioux,

b) the Yankton and Yanktonai bands of the Middle Sioux, and

c) the Teton or Western Sioux.

Among these three divisions emerged three dialects: Dakota for the Santee, Nakota for the Middle Sioux, and Lakota for the Teton or Western Sioux (Howard 1966-I: 3-4). The Assiniboin of Southwestern Manitoba are a sub-group of the Nakota-speaking Yanktonai (Howard 1966-I: 4). They formerly occupied the southern two-thirds of Minnesota and adjacent parts of Iowa, Wisconsin, North Dakota, and South Dakota (Howard 1966-I: 2-3).

The three divisions had different subsistence activities and settlement distributions. There is no adequate evidence to indicate when the Middle and Western divisions separated from the Eastern Santee although the linguistic similarities indicate that it had not been in the distant past. By 1700, the Tetons had already left the marsh and forest environment to become nomadic bison hunters (Meyer 1967: 10). However, during the late 1700's, the Santee were expelled from the Mille Lacs area by the Chippewa armed with European guns.

The Santee occupied primarily the Conifer-Hardwood Forest of Minnesota, a land of lakes and forests, as well as Oak Savanna and Aspen Parkland ecotones within which they had developed a Woodland subsistence orientation (Howard

1966-I: 4). Discrepancies exist in the subsistence activities attributed to the Santee. Howard (1966-I: 4-6) describes a base of hunting and fishing by men plus gathering and horticulture by women. He cites evidence by Skinner (1919: 167) and data by George Will to indicate that the women tended large gardens in which beans, squashes, pumpkins, tobacco and a distinct variety of corn were grown as evidence that horticulture had a respectable antiquity (Howard 1966-I: 4). Pre-contact rumours of the Dakota reported that they harvested corn and tobacco and that they had larger, better fortified villages than the Huron (Meyer 1967: 5).

The early historical accounts of traders and oral traditions provided a somewhat different view. Father Claude Allouez reported in 1665 that the Santee grew only tobacco and lived mainly on wild rice (Meyer 1967: 5). Father Hennepin who had been captured by them in the summer of 1679 described the tribes around Mille Lacs subsisting upon hunting, fishing, and wild rice gathering. La Sueur who established Fort L'Huillier near the mouth of the Blue Earth River in 1700, not only failed to mention evidence of horticulture but stayed in the area with the unfulfilled purpose of reducing warfare by making farmers out of the Dakota (Meyer 1967: 10-11). Landes (1968: 201-202), quoting from Pond (1908), states that very little corn was grown prior to 1837, in fact probably not enough to feed the whole population for more than a week or two.

The traditional subsistence round of activities of the Santee Dakota as described by Landes (1968) seems more reasonable than that of Howard or Skinner despite the fact that Landes' observations are a vague mixture of oral tradition of the early days plus personal observations of 1935 when she did her field work.

The following seasonal round is synthesized from Landes (1968: 161-214).

The Santee relied upon both bison of the prairies and forest animals such as deer. During the summer, beginning about May, the various villages of a band or several bands gathered for tribal bison hunts west of the Mississippi River. Apparently, certain men and women were chosen to go on the hunt, leaving the summer village to be tended by old people, men with families, and children. The meat was butchered and returned to camp.

Throughout the summer and fall, a variety of berries, cherries, plums, nuts and plants were collected by the women. The most important plants in addition to rice were the wild turnip and the water lily. They also picked "wild potatoes", wild onions and wild beans. The beans and potatoes were often obtained by raiding storehouses of field mice. Among the important berries were blueberries in July and cranberries in October.

Fishing was conducted primarily with spears. The use of the net is a recent historical phenomenon.

During the fall, in August or September, small family groups returned to the forested regions and visited the lakes to harvest wild rice. Although there was no ownership to the lakes, families tended to return to the same lakes near their villages.

Goose hunting was important during the fall. Groups stalked the geese behind screens of heavy weeds and thistles and travelled to lakes where the migrating geese stopped. Eagles and chicken hawks were hunted for their feathers but the meat of the eagle was discarded.

During the winter large bands subdivided and became involved in diffuse Woodland activities such as deer hunting which, unlike bison hunting, involved the pursuit of individual animals in the Deciduous Forest. It took place from late

September or October until sometime in January when there was a break to allow calving. Bear, wapiti, and, sometimes, moose were hunted during the winter but these hunts were side activities lacking the organization of the bison and deer hunts because these animals had no fixed feeding or resting places.

Fishing also took place in the winter. Holes were cut in the ice where an individual would wait with a spear or with a bow and an arrow with an attached string.

In early spring, March and April, subsistence activities shifted to trapping and sugaring. Trapping involved primarily men, alone or in groups, dispersing to public trapping grounds. Muskrat, beaver, and otter were the main animals to be trapped although skunk and raccoon were trapped in lesser numbers. While trapping, the men would take time to hunt ducks.

While the men were trapping or duck hunting, the women were sugaring with the help of some men who were old, crippled, or young. Following the sugaring activities, the few vegetables that were planted were placed in the ground when the strawberries ripened, about April. Following these spring activities, the groups then combined and moved west for the large summer bison hunts.

This variable subsistence round required considerable mobility and variation in size and distribution of settlements. There were large summer villages of bark and deer hide covered, gable roofed structures (Meyer 1967: cover; McKusick 1973: 30-31, 1974: 202-204). The summer group hunting the bison herds travelled in skin covered tipis. During the fall, many of the large village houses were sealed shut and the small hunting camps consisted of conical tipis and rounded wigwams covered with elm bark, rush mats and/or hides.

Data on Santee involvement in Southwestern Manitoba are equivocal. According to Landes' data, the only bison hunt took place on the Plains during the summer. On the other hand, the "Sioux" regularly entered Southeastern Manitoba along the Roseau River "war road" and the Red River, kept the Assiniboin north of the Assiniboine River during the autumn season, and were involved in frequent clashes with every group on the Northeastern Plains and Upper Mississippi (Innis 1962: 89-93; Meyer 1967; Holder 1970: 93-107). Most early accounts, however, do not differentiate among the three major groups of Sioux.

Groups occupying the Upper Great Lakes, particularly the Chippewa, Ottawa, and Santee of the Upper Mississippi drainage, utilized the forest zone, adjacent ecotone, and Plains. During the winter they relied primarily on diffuse and variable forest resources and lived in small dispersed groups. However, during the summer when their emphasis was upon bison and some gardening, groups lived in larger settlements.

Northeastern Plains

The Northeastern Plains was inhabited during the early historic period by both nomadic bison hunters and riverine horticulturalists. The latter also relied upon bison but their dependence upon horticultural produce tended to reduce their mobility. During the early historic period, several new groups emerged as distinct ethnic identities as a result of migration and tribal fission.

Among the Siouan-speaking horticulturalists were the Mandan and Hidatsa (Underhill 1971: 185; Wood 1967; Lehmer 1971; Wedel 1961; Holder 1970).

Both groups had a traditional economy based upon horticulture, hunting, and trading. These village groups were important trading partners with the Assiniboin of Southwestern Manitoba, providing corn, beans and other agricultural materials in exchange for meat, hides and, in the historic period, European items (Ray 1971).

These village tribes did not always remain near their villages. At times they went on bison hunts on the Plains and trapped eagles to the west. The Mandans have not been reported in Southwestern Manitoba although the Beaver Creek Journal[6] for 1823 records "Mandels" (Mandans or possibly Hidatsa) being at "the Mountain" (probably Turtle or Riding Mountain) (Chism 1971, personal communication. Also, Peter Pond reported "Maundians" of the Missouri trading corn at Pine Fort on the Assiniboine River in 1785 (Dick 1975: 5). Wood (1967: 10) reports an oral tradition which states that the Awaxawi (a village band of the Hidatsa) had been wandering north of Turtle Mountain before returning south and settling permanently on the Missouri River. The Métis guides travelling with Hind on the Souris River in 1857, identified mounds and earth works on the junction of the Gainsborough Creek and Souris River as remains of an old Mandan village (Hind 1860: 299). A Métis, François Jeannotte, born on the Souris River in 1806, claimed that there had been a Hidatsa settlement along the Souris River of Southwestern Manitoba (Vickers 1946: 7).

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[6] The Beaver Creek Post was a Hudson Bay Company post near the mouth of the Qu'Appelle River on the Assiniboine River in western Manitoba.

The village Hidatsa, Crow, and Minnetari were once one tribe. The village Hidatsa remained as sedentary village dwellers along the Missouri, while the Crow became nomadic groups out on the Plains to the West, trading with the sedentary groups (Underhill 1971: 183). The village Hidatsa had a reputation of travelling over greater distances than the Mandan and were known to have entered Southwestern Manitoba on at least two occasions (Howard 1970, personal communication). It is unclear whether accounts of nomadic Hidatsa in western Canada represent seasonal forays by members of the village Hidatsa or whether a nomadic group was emerging with a new lifestyle.

The Hidatsa or village Minnetari occupied three autonomous, sedentary villages (Bowers 1965). The Crow were a recent off-shoot representing at least two other groups. In addition, there appear to have been some nomadic Minnetaris or Hidatsa in the neighbourhood of the villages who were not Crow (Matthews 1969: 38).

The Crow are more closely related linguistically to the Hidatsa than to other Siouan groups (Lowie 1956; Wissler 1966: 184-185). Both groups could understand some expressions of the other's language, and the Crow might have separated from the Hidatsa about the early Fourteenth Century (Lowie 1956: 3-4). The Crow represented two divisions of nomadic hunters of the Western Plains. The River Crow lived on the Lower Yellowstone near its mouth, and the Mountain Crow followed a seasonal cycle of wintering in the Wind River Basin region and summering out on the Plains.

Hidatsa-Crow ethnohistory is riddled with problems, but one or more of these groups within this category spent time in Southwestern Manitoba. Bowers (1965) has presented a comprehensive discussion on the identity of the Hidatsa. From his research into early journals, particularly those that post-date 1797, and discussions with elderly Hidatsa informants during the 1930's, Bowers believes that Hidatsa ethnohistory can only be understood in terms of a series of three different villages with different histories.

The Hidatsa consist of the Hidatsa proper or Minnetari and the linguistically-related Awaxawi. The Minnetaris-proper, also known as Awatixa, claimed a long residence as horticulturalists along the Missouri River of North Dakota. The Minnetaris of the Willows, also known as Hidatsa or wandering Minnetaris, were nomadic peoples of the Northern Plains who settled down on the Missouri in recent times.

According to Bowers, the Awatixa are the oldest group of Hidatsa speakers along the Missouri River. A split developed in which the Awatixa remained along the Missouri River, between the mouths of the Knife and Heart Rivers, while a larger group, which became the Mountain or Western Crow, moved permanently to the upper Little Missouri.

The Awaxawi, who were related linguistically to the Hidatsa and recognized by the other Hidatsa as being related, had once lived to the East as agriculturalists on the streams of that region, later lived at Devil's Lake, and then moved to the Painted Woods region of the Missouri River in North Dakota prior to 1782. They fought with other Hidatsa for three years during this early period and moved down near Fort Yates to be near the friendlier Cheyenne.

The nomadic Minnetaris arrived at the Mandan villages near Heart Creek and then moved to the Knife River. At this time, the group split to form the agricultural Hidatsa and the nomadic River Crow. Early travellers such as Lewis and Clark and Leraye lumped the Hidatsa and Awatixa together, but distinguished the Awaxawi; Leraye referred to the Awaxawi as Gen-de-foulers.

During the period 1782-1800, the three Hidatsa groups combined with some of the Mandan as a result of increased conflict with the Sioux. Consequently close intervillage and intertribal cooperation developed. Further population reductions due to warfare and smallpox epidemics resulted in the Mandan, Hidatsa, and Arikara combining, although some Hidatsa rejoined the River Crow after 1845.

The territory covered by these Hidatsa prior to 1782 probably centered "on the north bank of Knife River (site 35) from which they ranged upstream along the Missouri, the tributary regions to the west, and the Mouse River[7] and Devil's Lake regions to the northeast" (Bowers 1965: 18-19). Village sites are reported at Turtle Mountain and at Star Mound, along the Pembina River valley to the east of the research region (Libby 1941: 231-241).

The Hidatsa appear to have been confused with the Mandan by some early travellers. Libby (1941: 231-241) argues that the village at which Pierre La Verendrye stayed was a Hidatsa village rather than a Mandan village and that his term "Mantannes" included both the Mandan and Hidatsa villages.

A third horticultural village-dwelling tribe along the Missouri River of North Dakota was the Arikara. The Arikara were Caddoan-speaking peoples who had separated from the Skidi Pawnee. The Skidi Pawnee were affiliated with the

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[7] The Souris River is called the Mouse River in North Dakota and was referred to by both terms in the early journals.

Pawnee proper and both groups occupied the Central Plains of Nebraska (Holder 1970; Grinnell 1961; Grange 1968). One historical reconstruction has the Skidi Pawnee entering Nebraska about A.D. 1400 and the other Pawnee entering about A.D. 1500 (Grange 1968: 118). Oral traditions given to Grinnell in the late 1800's provided a widely known account of these peoples coming from the southeast, in the area of the Arkansas and Mississippi Rivers, and an older less well-known account among informants of an original migration from the Southwest United States to the Southeast United States (Grinnell 1961: 216-237). The Arikara appear to be recent residents in the Northeast Plains, having travelled up the Missouri River from the Central Plains with an older tradition of having come from the southeast.

Among the nomadic Plains tribes of the Northern Plains were a variety of Siouan and Algonquian-speaking peoples, including the Assiniboin. During at least the Seventeenth and Eighteenth centuries, the Assiniboin included Southwestern Manitoba as part of their homeland.

The Assiniboin were physically and linguistically very similar to the Yanktonai Sioux from whom they separated. However, early Jesuit accounts identified them as a distinctive society differentiated both linguistically and physically by 1640 (Ray 1974: 4-6; Kennedy 1961: xxiv-xxvi).

Other evidence of an early recognition of the Assiniboin as a distinct ethnic group was Creuxius' map of 1660 which showed a River of the Assiniboin flowing into Lake Nipigon (Vickers 1951b: 41 quoting Nute 1943: 73). It was evident that by the latter part of the Seventeenth Century, the Assiniboin were known to have ranged over a large territory. A Jesuit map of 1670-1671 indicated that their western range was 120 leagues northwest of the mouth of the Kaministikwia River. The French trader Du Lhut traded with them at the west end of Lake Superior in 1679; DeLisles' Paris map of 1703 showed the range of the Assiniboin to be west and north of Lac Des Assenipoils (Lake Winnipeg); they were trading at the English posts on Hudson Bay in the 1680's; and they guided Henry Kelsey from York Factory to the Saskatchewan River and up the Saskatchewan River to the grasslands of Saskatchewan and Alberta (Vickers 1951: 42-43). The evidence from the Eighteenth Century indicating that the Assiniboin homeland included southern Manitoba, west of the Red River and eastern Saskatchewan, is abundant (Vickers 1951: 43-44). By the late 1600's their territory included the area from the east shore of Lake Winnipeg to the Touchwood Hills of eastern Saskatchewan, and by 1755 they were known to have occupied eastern Alberta (Ray 1971: 50-55). Denig (1961: 63-64) states that their territory extended south to the upper reaches of the Missouri River and Milk River in Montana. To the north, the Assiniboin territory coincided with the Aspen Parkland and as late as the mid-1700's they were found as far to the northeast as the east shore of Lake Winnipeg (Ray 1974: 16-18).

The southern and eastern boundaries of the Assiniboin territories had contracted in the late 1600's. By 1680, they had abandoned most of their lands in northern Minnesota, and by 1730 had left the Rainy Lake region of Ontario (Ray 1971: 48-49). During the mid-1700's, their territory ranged from the eastern shore of Lake Winnipeg west onto the Plains, and south to the upper reaches of the Missouri River. In 1755, they met Anthony Hendry (sometimes written as Henday) at York Factory on the Hudson's Bay and led him west along the Saskatchewan River into eastern Alberta. They were sufficiently familiar with this vast territory to know when they were entering enemy territory.

In southern Manitoba, they were nomadic bison hunters. According to Ray (1971: 81-84), their pre-horse round of activities was as follows:

a) winter - lived in the parkland or wooded valleys and hunted bison and wolves;

b) spring - set fish weirs along the principal rivers such as the Assiniboine River, and sent raiding parties against the Gros Ventre and Western Sioux;

c) summer - hunted the bison on the open grasslands;

d) fall - hunted bison on the trip down to the Mandan villages on the Missouri River where they traded for corn.

During the late Seventeenth Century they were still collecting wild rice when they were near the west end of Lake Superior but they appear to have abandoned this area and activity by the latter part of the Eighteenth Century. This cyclical round of subsistence activities applies only to those groups living in Southwestern Manitoba. A later section on the Assiniboin on the Northwestern Plains indicates that there were a number of different adaptive modes of subsistence; Ray's description of uniform behaviour may reflect a simplistic analysis of the data.

The Wiceyela or Middle Sioux, consisting of the Yankton and Yanktonai, were first noted in the area of Leech Lake in north central Minnesota in 1683 and moved west shortly after to eastern South Dakota (Howard 1966-II: 1). When they moved to the Missouri River region, they developed an alliance with the Siouan-speaking Ponca and displaced the Caddoan-speaking Arikara upriver. Howard's date of late Seventeenth Century for the westward movement of these groups seems somewhat too late since both Radisson in 1665 and Hennepin in 1680 referred to more westerly bison hunting prairie Sioux (Meyer 1967: 3-7). It is unclear whether these early accounts are recording a seasonal round of activities or a group that had adopted a Plains lifestyle.

Many of the Middle Dakota subsistence activities and technological traits reflect interaction with the riverine horticultural tribes (Howard 1966-II: 1-3). The economy was based upon hunting, fishing, gathering, and river-bottom horticulture. They went on two great bison hunts during the mid-summer and late fall. According to the previous discussion on bison movements, the mid-summer hunt should have taken place to the west of the Missouri River in the area of the Missouri Coteau and the late fall hunt should have taken place to the north along the northeastern periphery of the Plains and adjacent Aspen Parkland. Howard (1966-II: 2) indicates that the bison hunts did take the groups far west of the Missouri River. Early fur trade accounts refer to the fear of the Assiniboin in southern Manitoba of meeting with Sioux hunting parties or war parties (Vickers 1946: 4).

In addition to the major tribal hunts, individuals and small groups hunted bison, wapiti, deer, antelope, and rabbit near the villages. They also fished the shallow streams by using large weirs and weighted seines and fished the glacial lakes using hook-and-line and bow-and-arrow techniques (Howard 1966-II: 2).

Women practised horticulture along the river bottoms. They raised at least three varieties of corn, two varieties of squash, and three varieties of beans (Howard 1966-II: 2 referring to George Will). They also collected tipsina, choke cherries, and a variety of other wild foods.

The influence of the riverine horticulturalists can be seen in the adoption of the earthlodge, in addition to the skin tipi and skin-covered wigwam, the bull boat, and clothing style. They made fine, small pottery vessels during the Nineteenth Century but may have obtained all or some of the large vessels through trade with the Arikara and Mandan (Hurt 1950: 1).

The Middle Sioux represented a blend of eastern Woodland traditions, Plains bison hunting activities, and Plains horticultural activities. They occupied a transitional environmental zone and practised a transitional adaptive strategy between the Eastern Santee Dakota and the western Teton Dakota.

The Teton or Western Dakota were nomadic Plains dwellers (Hassrick 1964). Howard (1966-III: 1) states that they were located on the Upper Mississippi River in Minnesota in 1680, in the Lake Traverse region of northeastern South Dakota by 1700 and along the Missouri River by 1750. These dates appear somewhat late since the Teton are presumed to have separated from the Santee Dakota before the Yankton and Yanktonai who had a distinctive subsistence by the early 1600's. Furthermore, a brief, lineal migration of this nomadic group is unlikely in light of the knowledge we have of the vast area and mobility of the Assiniboin who were closely related and making a similar shift to a nomadic Plains subsistence. These peoples would also be dependent upon the movement of bison and the seasonal variation in resources.

One Teton legend attributes the first crossing of the Missouri River to a period when the Cheyenne had already crossed and had horses (Howard 1966-III: 1-2). One must treat the details of such accounts with some caution. Snelling's account (Flanagan 1971) of the Assiniboin separating from the Yanktonai included references to the Yanktonai having guns and horses, yet we know that the Assiniboin had separated from the Yanktonai at least 200 years before the Yanktonai had horses. Regardless of the time of westward shift, it was probably a gradual and somewhat haphazard movement of various sub-groups (Howard 1966-III: 1).

Once the Teton had crossed the Missouri River and shifted to a nomadic Plains existence, bison became the main resource although deer and antelope supplemented the diet (Howard 1966-III: 2). Bison were hunted either during a large summer communal hunt or during various family hunts. The hunting of all other animals tended to be by the family or individual and included deer, wapiti, antelope, bear, wolf, kit foxes, raccoons, badgers, porcupines, beaver, muskrat, mink, red squirrels, prairie dogs, skunks, bobcats, ducks, geese, prairie chickens, eagles, screech owls, crows and hawks (Hassrick 1964: 188-208). They also fished and captured turtles and tortoises. Women collected a variety of plant materials including berries such as rose hips, buffalo berries, cherries, gooseberries, strawberries, juneberries, artichokes and plums, root vegetables such as wild potatoes, prairie turnip or timpsila, and wild onions as well as a variety of miscellaneous plants such as cacti, beans, acorns and fungi (Hassrick 1964: 202-204).

When the Tetons moved onto the Plains, they attempted to maintain access to the Black Hills of southwestern South Dakota. The Black Hills were also a favoured location of the Cheyenne and Crow. Hassrick (1964: 189) attributes this interest in the Black Hills to a lingering tradition of earlier Woodland lifestyles. A more likely reason is the necessity of having the Black Hills as a major resource center during the winter when the open grasslands were devoid of game and the sheltered wooded areas of the Black Hills became a major winter sanctuary.

The Plains Ojibwa (Saulteaux, Chippewa or Bungi) had occupied parts of the Northeastern Plains by the latter part of the Eighteenth Century. Alexander Henry the Younger met with the Ojibwa at the confluence of the Red and Assiniboine rivers in 1801 (Vickers 1946: 3). By 1817, they were recognized by the Cree as being owners of the land as far west as the Muskrat Creek (west and north of Portage la Prairie) which flows into the south end of Lake Winnipeg (Vickers 1946: 3). The Plains Ojibwa were found on the Assiniboine, Souris, Red and upper Missouri rivers by the late 1790's and were known to send war parties as far west as the Rocky Mountains (Howard 1965b: 13-16).

The transition from the eastern Woodland to a Plains subsistence emphasis was gradual. In the late 1700's, wapiti and deer were more important for the fall hunt than the bison, but by the 1830's they were fully adjusted to Plains life with the large, autumn bison hunts becoming an integral part of the seasonal round (Howard 1965b: 15-18). Hunting of blacktail deer, Virginia whitetail, moose and wapiti, antelope, and caribou plus smaller game such as beaver, badger, rabbits, squirrels and skunks augmented the diet (Howard 1965b: 25-26).

The women collected a variety of berries and tubers. Wild rice was harvested on the small lakes near the Red River and although some corn was being planted in the early 1800's, it does not seem to have been important (Howard 1965b: 28-29).

Two tribes that inhabited the Northeastern Plains during the early historic period were the Ponca and Omaha. They were Degiha-speaking Siouan tribes who brought a muted form of the Middle Mississippian tradition from the southeast to the Plains (Howard 1965a).

The Ponca and Omaha were Missouri village dwellers with traits of both

Woodlands and High Plains cultural orientations (Howard 1965a). Their territory prior to the reservation period included the Missouri and Niobrara Rivers in southeastern South Dakota and northeastern Nebraska. Their former territories included the Black Hills of South Dakota and occasionally they hunted as far as the Rocky Mountains.

According to Omaha tradition, the Omaha and Ponca migrated through Missouri, Iowa, to the headwaters of the Des Moines River in southwestern Minnesota, then northeast to the Big Sioux River of eastern South Dakota. After a disastrous battle with the Sioux, they moved southward and settled in northeast Nebraska (Howard 1965a: 14-15). Maps of the early 1700's place the Omaha and Ponca in the area of the Big Sioux or Vermillion River in eastern South Dakota, but by the late 1700's they are recorded on the Missouri and Niobrara Rivers (Howard 1965a: 24-25).

The Ponca had a typical plains village economic orientation. It was based upon a combination of hunting, fishing, gathering, and horticulture with hunting occurring primarily as two large hunts in the spring and fall, attended by all members. Hunting was also carried on near the villages by small groups of males (Howard 1965: 39). They lived in sedentary, bastioned villages.

The presence of the Omaha and Ponca on the Plains of eastern South Dakota and southwestern Minnesota during the early 1700's raises the possibility that they may have been involved in autumn bison hunts into Southwestern Manitoba. Other possibilities include trading and/or military excursions within or near Southwestern Manitoba.

Among the tribes of the Northeastern Plains, the Assiniboin and late Plains

Bungi utilized Southwestern Manitoba as a core or home area. The Hidatsa (prior to 1782), Yankton and Yanktonai, and Teton Dakota utilized the region as a secondary area for the seasonal hunting of bison, particularly during the autumn. The later Hidatsa and possibly the Mandan utilized the region intermittently as a tertiary region. The Ponca and Omaha probably also used the region when they were former inhabitants of the Northeastern Plains.

Large tribal hunts were a characteristic of the summer utilization of the bison on the Plains. Bison hunting near camp during other seasons involved only small groups.

Horticulturalists utilized sedentary structures. The historic Mandan, Hidatsa, Arikara, and Middle Sioux used the circular earth lodge. These structures differ from the temporary tipi structures of the Plains groups, the small winter wigwams of the eastern Algonquians, and the large long houses of the Santee.

Northwestern Plains

The Northwestern Plains were inhabited primarily by a variety of Algonquian-speaking groups who had left the Northeastern Woodlands at various times in the past. Among the Algonquian-speaking peoples were the recent Plains Cree and Plains Ojibwa groups, the earlier Blackfoot confederacy consisting of the Blackfoot (Siksika), Piegan (Pikuni), and Blood (Kainah) plus the Athabaskan-speaking Sarsi, the Gros Ventre of the Plains (Atsina, Fall or Rapid Indians), and the Cheyenne. In addition, there were the Plains Assiniboin who were late comers, the Crow who broke off from the Hidatsa, and the Snakes. The latter is believed to be a synonym for the Shoshone (Byrne 1973: 520).

The Plains Cree and Assiniboin represented Seventeenth and Eighteenth Century immigrants as a result of parent groups being middle men in the developing fur trade and active suppliers of furs from westerly sources as eastern areas became depleted of furs. Their movement consisted of periodic trips up the Saskatchewan River to the country of the Blackfoot tribes and eventually a shift by some to becoming predominantly bison hunters.

Andersen (1970: 52-59) refutes the simplistic model of Assiniboin migration postulated by Jenness in which the Assiniboin moved west as two branches, a northern branch following the forest edge of the Plains (the Aspen Parkland) and a southern branch travelling out the Assiniboine River and the area north of the upper Missouri River. He concludes that the Assiniboin of the late 1700's in western Canada represent at least three different patterns of environmental adaptation:

a) the Wood Stoney followed a yearly cycle of hunting, trapping, fishing and gathering in the forested river and lake foothills between the Athabaska and North Saskatchewan rivers,

b) the Wood and Plains Stoney followed a dualistic adjustment of intensive hunting of forest game in the winter and intensive bison hunting of the Plains in the summer and,

c) the Plains Stoney which developed an equestrian bison hunting orientation similar to the Teton Dakota.

As has been discussed previously, groups like the Teton relied upon Woodland zones for game and shelter during the winter.

There has been some confusion in the literature as to the identifications assigned to the term Gros Ventre. As early as 1877, Matthews (1969: 33-34) noted that the term was used for all Missouri Hidatsa or "village Gros Ventre" as well as for the nomadic Fall Indians along the Saskatchewan River, and that these Fall Indians spoke an entirely different language. These Fall Indians or Gros Ventre of the Plains are likely the Atsina, a branch of the Algonquian-speaking Arapaho, who were, at times, in alliance with the tribes of the Blackfoot confederacy (White 1913: 51-52). The term Gros Ventre shall be used only for this Algonquian group.

The Gros Ventre of the Prairies were located during the late 1700's in the Saskatchewan River basin, particularly along the South Saskatchewan River (Flannery 1953: 3-5). Alexander Mackenzie reported them with the Assiniboin Indians in 1789 near the central portion of the Assiniboine River (Flannery 1953: 8). After 1780, they were pushed south and west by the Cree-Assiniboin alliances and by 1808 were occupying the area between the upper Missouri River and the South Saskatchewan River where they came into conflict with the Crow. Alexander Mackenzie gave their distribution as being from the north bend of the Missouri River to the south bend of the Assiniboine River (an area which incorporates the entire research region), and Hind reported in 1857 that they formerly hunted along the Assiniboine River (Vickers 1946: 6).

It is not known when they separated from the Arapaho but some Gos Ventre did rejoin the Arapaho in the late 1820's (Flannery 1953: 17). The oral traditions of the Arapaho refer to a migration of the Arapaho and Gros Ventre (Atsina) from the east, probably the Red River Valley of Minnesota, and a subsequent separation of the Gros Ventre from the Arapaho (Ewers 1958: 6).

The tribes of the Blackfoot confederacy have the least linguistic affiliations with the eastern Algonquian groups and are, therefore, assumed to be the earliest group to separate from the proto-Algonquian stock. During the late 1790's, they are listed as being found on the upper and middle South Saskatchewan River and 5 slowly moving northwest (White 1913: 427). Grinnell (1892: 159) gives a homeland to the north of Lesser Slave Lake, although Bryan (1969: 35-37) points out that this latter geographical placement may be the result of equating similar Native terms with different meanings. If, however, the tribes of the Blackfoot confederacy did migrate along the Saskatchewan River, then at sometime they would have had to have occupied Manitoba. Not only are they likely to have utilized the Aspen Parkland as did the later Cree and Assiniboin but they are also likely to have utilized the grasslands of Southwestern Manitoba.

The Cheyenne were an Algonquian-speaking nomadic plains tribe who are believed to have shifted from a sedentary village life activity around Lake Superior to a nomadic pattern east of the Missouri between the early 1600's and late 1700's (Hoebel 1960; Holder 1970). They were probably located on the Mississippi River above the Wisconsin River in the early 1600's, later along the Minnesota River, the Sheyenne River of North Dakota (which they left by 1700), the Missouri River, and finally wandering over much of the plains by the early 1800's (Wood 1971: 52-54). Both Wood (1971) and Holder (1970) have emphasized that it is unlikely that the migrations represented single tribal movements; rather, they moved west as separate bands with some of the bands having crossed the Missouri River and having become nomadic by the late 1600's.

The time of movement can be ascertained by combining the oral traditions of a number of tribes. Prior to crossing the Missouri River, they fought with the Assiniboin but were continually defeated because, according to both Cheyenne and Assiniboin accounts, the Assiniboin had guns and the Cheyenne did not (Grinnell 1956: 7-9).

Some reached the Missouri River about 1676 and after crossing the river, they were in conflict with both the Crow and Comanche who were inhabiting the area east of the Missouri River, particularly the Black Hills (Grinnell 1956: 6-7).

The transition from being sedentary horticulturalists to nomads was also likely to have been gradual and carried out by different groups at different rates. During the periods that they lived on the Sheyenne River, bison hunting was an important activity and horses were being used (if the Biesterfeldt Site is a historic Cheyenne village site). It is entirely possible, then, that they may have been entering southern Manitoba, at least seasonally, between the late 1600's and early 1700's.

The Suhtai were linguistically closely related to the Cheyenne, had preceded the Cheyennes to the Plains, and were living in the Black Hills (Grinnell 1961b: 161, 1923). However, they joined with the Cheyenne and lost their separate identity; almost nothing is known about this group.

The Ethnohistoric Utilization of Southwestern Manitoba

A study of the social environment in and near the research region indicates tremendous ethnic diversity as various groups moved across biomes on either a seasonal or migratory basis. In order to understand the archaeological complexity of the region and to develop a research orientation that will account for this complexity it is necessary to appreciate the variability represented by the known historical groups.

The data on the varying resource potential and on the ethnohistoric accounts provided the bases for a number of postulates. These postulates are applied later to the archaeological data.

Postulate 3:

> Numerous groups co-existed in Southwestern Manitoba during the pre-reservation period.

The number that used the region at any one time varied. During the early and mid 1700's, nine groups definitely used the region (Assiniboin, Western Cree, Bungi, Yankton and Yanktonai, Teton, Santee, Hidatsa, and Plains Cree) and six other groups probably or possibly used the region (Ottawa, Awaxawi, Omaha, Ponca, Cheyenne, and Suhtais). In the late 1700's and early 1800's, groups like the Bungi, Yankton, Yanktonai and Ottawa were making greater use of the region while other groups such as the Santee, Ponca and Omaha had shifted southward. During this latter period, eight groups utilized the region (Assiniboin, Yanktonai, Yankton, Teton, Plains Ojibwa, Gros Ventre, Hidatsa, and Plains Cree) and two other groups (Ottawa, and Crow) probably used the region. Within the historic period the number of co-existing groups ranged from eight to possibly fifteen.

These numbers of Native groups are in marked contrast to the situation portrayed in the previous Chronological Model that indicated the presence of only one group in the region (MacNeish 1954, 1958). This postulate has important ramifications for archaeological research. It follows that:

a) since numerous groups utilized the region during the historic period, an equal number of historic archaeological complexes should be identifiable.

b) the assignment of a particular archaeological complex to an ethnohistoric group must demonstrate that only one group is responsible for that complex.

Two major limitations of previous research orientations have been to study the ethnohistory of a limited region with its limited historical accounts and to plot groups according to limited home ranges. The utilization of data from resources beyond a specific region and a concern for the total range of distribution of various groups changes requires a Co-Influence Sphere Model.

Postulate 4:

> The geographical distribution of any major Native ethnic group whose homeland included part of the Northern Plains incorporated large tracts of environment that cross-cut two or more distinct biomes.

The tendency on the part of ethnohistorians, ethnographers, and archaeologists to plot the distribution of groups in a confined homeland or territory has resulted in a skewed model of distribution. Examples that refute this simplistic model include the Santee of central Minnesota ranging west of the Missouri River (Howard 1966); Mantels (Mandan and/or Hidatsa) of central North Dakota ranging north into Western Canada, westward to the Missouri, Little Missouri, and Yellowstone rivers of extreme western North Dakota, and west of the Missouri Coteau (Bowers 1950, 1965); and the Cheyenne occupying the Black Hills and vast expanses of the Northern Plains (Hyde 1959: 140-152; Grinnell 1923, 1956).

The overall distribution of a particular group included:

a) basic subsistence activities such as hunting seasonal resources,

b) trading, and

c) intertribal conflict.

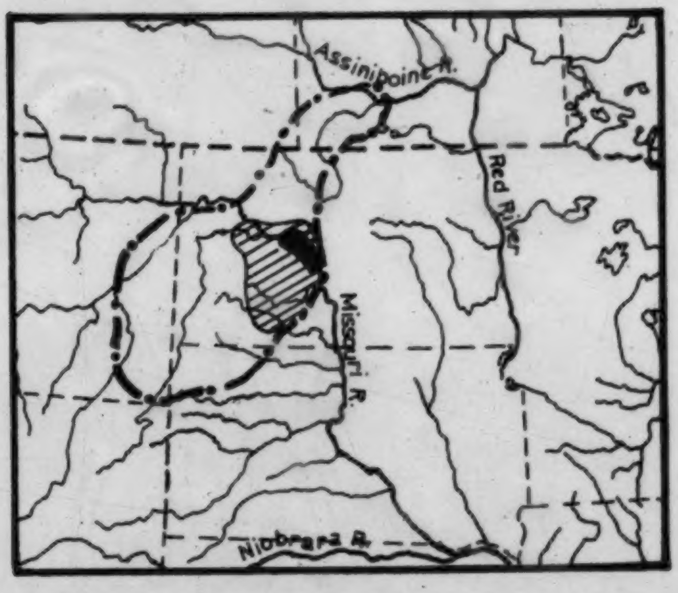
For groups on the Plains, the normal reaction to seasonal movement of bison was to hunt them in large groups when they gathered in vast herds during the summer and then to divide into bands to hunt smaller herds during the winter season. These bands tended to develop a regular pattern of shifting biomes as they followed the specific migratory movements of particular herds of bison (Bushnell 1922: 18; Fisher 1968: 28; Ray 1974: 94-98; Pettipas 1975: 3). Reliance on bison required a dual environmental distribution of the Plains and one or all of the Aspen Parkland, wooded uplands such as Turtle Mountain, and river valleys (Pettipas 1975: 5).

Trading required numerous groups to leave their homelands to gather at major centres on the Plains and Upper Great Lakes. This variable is dealt with in more detail in the next section.

Raiding was important among all Plains and near-by Woodland groups. It provided an outlet for achievement for males (Lowie 1954: 114-123), and reflected conflict over resources (Hickerson 1970; Hassrick 1964), as well as basically unstable interactions in which real or fanciful slights resulted in feuds (Lowie 1954).

Since any one group utilized large areas due to subsistence, trade or conflict, the distribution of a group can best be considered in terms of its core or home, secondary, and tertiary area (Figure 8, Table 2).

The core or home area included the environment in which most resource utilization or time is spent; e.g. with the Mandan and Hidatsa tribes of the early historic period, the Missouri River and tributaries in central North Dakota were used for permanent villages, the production of large quantities of garden produce, and the hunting of large and small game. The secondary area involved the seasonal, communal bison hunts to the west of the Missouri River. Tertiary areas included


Assiniboine R.
Red River
Missouri R.
Niobrara R.

■ Core or Home Area, after Driver (1964: Map 42)

▨ Secondary Utilization

┅ Schematic Distribution of Tertiary Utilization

Figure 8. Schematic Presentation of Early Historic Environmental Distribution Showing the Area that Must be Considered for the Mandan and Hidatsa Compared to Earlier Simplified Distributions.

those utilized intermittently, briefly, or for resources of lesser importance; e.g. hunting eagles, elk, mule deer, and mountain sheep in the Badlands of extreme westerly North Dakota and periodic bison hunts in southern Manitoba.

Postulate 5:

Southwestern Manitoba was utilized differentially on a seasona basis.

The following sub-sections of this postulate identify major seasonal trends:

a) During the winter, Southwestern Manitoba was occupied only in sheltered areas.

The harshness of the winter climate and the necessity for shelter on the part of the animals, required hunters to seek game in the sheltered river valleys, the treed parts of the Aspen Parkland, and the forested uplands. The necessity of sheltered areas was demonstrated by the importance of more southerly forested uplands such as the Black Hills to a variety of groups, including the Comanche, Cheyenne, Teton, and Crow.

The sheltered areas contained diffuse resources, available in sufficient variability to support small groups. Both Plains groups, such as the Assiniboin, and Woodland groups, such as the Western Cree, utilized the sheltered areas. Other ethnohistoric groups whose winter camp sites should be found include the Plains Cree and Bungi.

b) During the spring, Southwestern Manitoba was occupied throughout all zones.

The region was occupied primarily by Plains groups who followed the bison onto the Plains. Resources were available in the sheltered areas and on the open Plains. The rivers, lakes, and ponds were important for fish and water fowl. The bison were scattered throughout the region and a variety of diffuse resources were available in the wooded portions.

The woodland groups shifted eastward to the forested regions where they relied upon fish, water fowl, maple and box elder sugar, and the diffuse resources such as deer, moose, muskrat, beaver, and fur bearers.

c) During the summer, Southwestern Manitoba was not occupied.

Both the resource potential and ethnohistoric record indicate that the Plains and Boreal Forest were more desirable areas during summer. Bison were gathered as vast resources and were hunted by entire nomadic tribes as well as hunting parties of the village horticulturalists (e.g., Mandan, Hidatsa), the forest-grassland transitional groups (e.g., the Middle Sioux), and the eastern forest groups (e.g., Santee, early Cheyenne). The abundance of bison enabled the Plains groups to gather in large aggregates for social and religious gatherings.

The Algonquian forest groups (e.g., Western Cree, Western Ojibwa) moved into the Boreal Forest or Conifer-Hardwood Forest to tap intensive resources such as fish and migratory water fowl as well as a variety of diffuse but large forms such as moose and caribou.

d) During autumn, Southwestern Manitoba was occupied by numerous groups from the Plains and Plains-Forest transition zones.

The importance of Southwestern Manitoba during this season lies in the fact that it encompasses:

a) part of the migration route of bison prior to the fission of the herds into small groups for the winter,

b) part of the "wetlands" with the vast flocks of migrating water fowl, and

c) the diversity of diffuse resources associated with the Aspen Parkland, wooded river valleys and wooded uplands.

The Plains hunters to the west and south (e.g., Gros Ventre, Teton, Assiniboin, Crow) followed the bison eastward. The autumn bison herds provided the last opportunity (with plentiful resources) to meet for tribal gatherings and to accumulate surplus food and items for trade and storage. During the autumn and early winter, the Assiniboin accumulated bison meat and hides to trade with the village tribes. Various Sioux or Dakota groups ranged into southern Manitoba, often driving the Assiniboin north of the Assiniboine River. The Hidatsa, and probably the Mandan, Cheyenne, Ponca and Omaha, also undertook autumn bison hunts in and near Southwestern Manitoba. The Bungi and Ottawa hunted the Grasslands of southern Manitoba and undoubtedly utilized Southwestern Manitoba, at least periodically.

Postulate 6:

> Differences in tool kits or assemblages among groups in Southwestern Manitoba were primarily reflections of cultural variation rather than functional differences.

All groups who inhabited Southwestern Manitoba relied primarily upon bison or smaller diffuse resources during their occupation of the region. Therefore, their tool kits included basic killing and butchering tools and tools for making domestic items. The Woodland groups who shifted to intensive utilization of fish, with a concomitant set of specialized tools, did so in the forested regions to the east. The intrusion by horticulturalists with their specialized tools were represented primarily by seasonal bison hunters. Differences in tools would have been confined to stylistic cultural variants.

Postulate 7:

The distribution of numerous groups represented a series of overlapping ranges.

When the core, secondary and tertiary areas of all groups are considered, there are a series of overlapping zones. The total territory used by a single group varied according to resource utilization and social interaction. The territories were generally very irregular since their shape was determined by the biomes, warfare zones, and trading centres that were being utilized.

The importance of using ethnohistoric data over models extrapolated from other sciences is apparent. Others (Wobst 1974: 152-155; Wilmsen 1974: 71-74) have used hexagonal spacing organization models from geography for paleolithic social systems because hexagonal spacing combines optimum geometric packing efficiency with minimal movement and boundary costs. However, the use of models from other fields with non-comparable data is often fallacious. The ethnohistoric evidence for the nomadic and semi-sedentary groups of the Boreal Forest, Aspen Parkland, Upper Great Lakes, and Northern Plains shows that:

a) when the core, secondary, and tertiary areas of distribution are considered, groups did not live in mutually exclusive territories (as the simplistic maps of many texts show) of a hexagonal, or any other relatively uniform, geometric shape;

b) any group overlapped territorially with several groups because of the fluctuating resource potential, on a seasonal basis, heterogeneity of the resource potential, trade, and conflict;

c) territoriality of groups changed on a seasonal basis because of shifting resource potential, natural catastrophe such as fire, and/or changing patterns of inter-tribal interaction.

The hexagonal spacing models may be useful when there is a homogeneous environment, little mobility, and populations who are utilizing the resource potential to its maximum carrying capacity. The first two variables do not apply to the groups and areas under consideration in this thesis. The third variable is also unlikely since the resource potential has been so variable due to climate, natural catastrophes such as fire, and changing inter-tribal relationships that any attainment of optimum carrying capacity during a period would necessarily be followed by subsequent population reduction or migration, the latter being possible only when there are empty territories or demographic vacuums.

The Co-Influence Sphere Model with a series of overlapping territorialities represents a simplified but realistic model of space utilization. This model, based upon resource potential variablility and ethnohistoric evidence, is useful for the prehistoric hunters of a similar environment.

Postulate 8:

> The movements of groups and/or changing resource potential create demographic vacuums.

The early historic record contains numerous accounts of Plains and Woodland groups moving in and out of areas. In southeastern Manitoba, the Bungi settled in the Red River valley which was rich in animal life because it had been a no-man's land (Howard 1965b: 14). A succession of numerous groups shared the forested upland of the Black Hills but at other times single groups like the Cheyenne were the sole occupants (Hyde 1959: 140-152). These examples reflect change primarily due to conflict .

A second cause of demographic vacuums was natural disaster due to drought or fire (Pettipas 1975: 5-9). The historic record indicates that droughts turned parts of the Plains into a wasteland in which the rivers dried up, the shallow lake beds became dust bowls, the sloughs could no longer support water fowl, grasshopper infestations consumed most edible plants, and fires were frequent (Pettipas 1975: 5). Tree ring and paleosol studies on the Plains show that similar conditions also occurred during the prehistoric period. When this situation developed, such as in the Sweetwater country of Wyoming in 1846, the bison left and the Ogallalah Sioux were forced to leave or to starve (Pettipas 1975). Other groups were forced to react in the same manner to droughts.

Movement in response to natural catastrophe or conflict is a common reaction. One may expect, therefore, that migration is an important process by which new traits and complexes suddenly appear or disappear.

Influence of Trade Networks

Wood states that "aboriginal North America was blanketed by a network of trails and trade relationships which linked, to a greater or lesser degree, every tribe to one or more of its neighbours" (Wood 1972: 154). Exchange networks were the result of variable distribution and access of resources and the efforts by groups to "forge a link between social and natural resources" (Wilmsen 1972: 2). Trade networks resulted in the movement of people, goods and ideas in addition to producing a levelling in resource non-accessibility. Since the Southwestern Manitoba region is situated on the peripheries of several environmental zones, each with its own variability, it is important to look at the exchange networks that emerged in the Upper or Western Great Lakes and Northern Plains.

Great Lakes Trade Networks

In his analysis of exchange networks in the Western Great Lakes during the early and mid-Seventeenth Century, G. Wright (1967, 1968) discusses the magnitude of the exchange that was taking place, the nature of the commodities that were being exchanged, and the nature of the social interactions that resulted in the exchange. Much of the evidence for the early part of the Seventeenth Century relates to French observations of more easterly tribes such as the Ottawa, Huron, Iroquois, and Nipissing. The Ottawa, in particular, were noted as traders; both Champlain in 1615 and Sagard in 1620 noted that the Ottawa traded with groups who came to their villages and travelled as far as 400 leagues[8] (G. Wright 1967: 182). In the mid-Seventeenth Century, the Green Bay area of Lake Michigan was a major trading centre. The Huron, Ottawa, Mascouten, and Potawatomi were trading at Green Bay, and groups like the Potawatomi then traded further inland (G. Wright 1967: 184). Radisson reported trading among eighteen tribes, including the Santee Dakota, at a Feast of the Dead ceremony in 1660 somewhere in the vicinity of Lac Court Oreille, near modern Hayward, Wisconsin (Meyer 1967: 1-2).

Using Cleland's (1966: 4-12) biotic provinces (Figure 9), G. Wright identifies the ecological diversity within the Great Lakes Area as a major factor in intertribal trade. According to this model, the groups were combined as

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[8] A distance of 1546 or 2962 km., depending upon the conversion formula that is used.

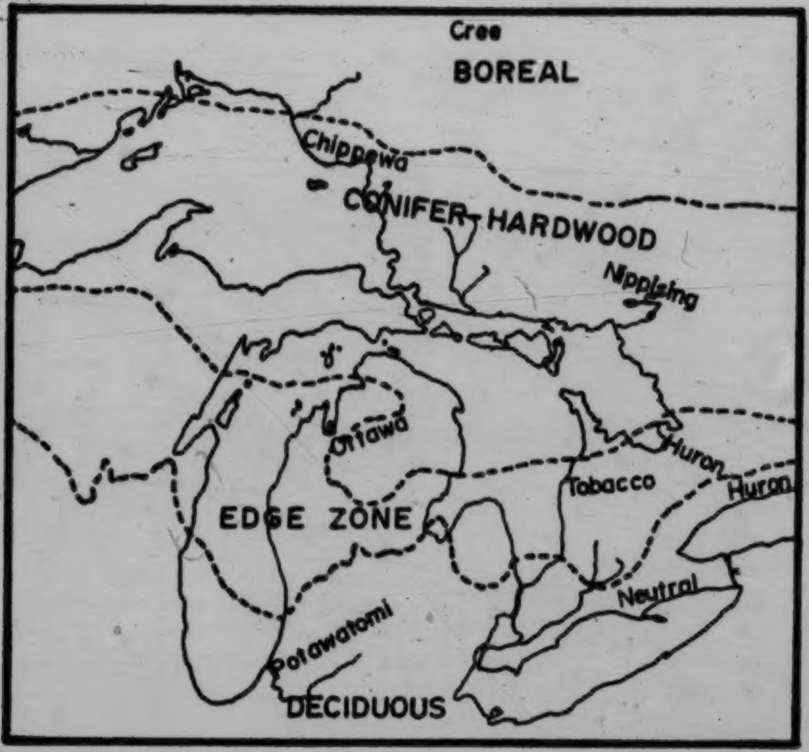
Cree
BOREAL
Chippewa
CONIFER-HARDWOOD
Nipissing
Ottawa
Huron
Huron
Tobacco
EDGE ZONE
Neutral
Potawatomi
DECIDUOUS

Figure 9 . Biotic Provinces of the Upper Great Lakes (After G. Wright 1967: 186).

follows:

a) the migratory Algonquian bands such as the Cree, Ojibwa, Naskapi and Montagnais lived in the Hudsonian (Boreal Forest) zone and were mainly hunters;

b) the Menomini, Ottawa, Chippewa and other Algonquian bands who occupied the Canadian Biotic zone were hunters-gatherers who lived on lake shore villages during the summer fishing season and in small family groups during the winter;

c) the Huron, Neutral, Potawatomi, and Sauk-Fox of the Carolinian zone were agricultural peoples who raised corn, beans, and squash, hunted deer, fished and trapped; and

d) the farming Tobacco Huron, and farmer-trader Huron of Huronia,and Ottawa who occupied the Carolinian-Canadian transition zone combined farming, hunting, fishing and trading (G. Wright 1967: 185; Cleland 1966: 9-11).

A series of exchange systems developed, for example, in which agricultural commodities from the Carolinian zone were exchanged for a variety of items obtained by hunters in the Hudsonian (Boreal Forest) zone. The items of trade were numerous and were dispersed according to specific social value systems.

Among the materials that were traded prior to the fur trade, food items represented one of the major classes being traded across environmental and ethnic boundaries (G. Wright 1967). Maise, beans and sunflowers (seeds and oil) were being traded out of the Carolinian and Carolinian-Canadian transition zones into other zones in exchange for meat and fish. Tobacco was limited to the agricultural zone but was traded widely. These items were highly perishable. Other materials that were equally perishable were hemp (for fishnets), rush mats (which Sagard in 1620 noted that the Ottawa women were making specifically for trade), medicinal roots and herbs, wild rice, hides and pigments. Animal protein such as meat and fish were the major food items traded by the northern nomadic hunters and gatherers to the horticulturalists of the Carolinian and Carolinian-Canadian zones (G. Wright 1967: 185). All of these food items were important, yet with the possible exception of some skeletal elements associated with the animal protein, are unlikely to appear in the archaeological record.

Among the non-perishable items to be considered are raw materials, utilitarian items, and ceremonial items. Sources of important raw materials such as good quality cherts did not appear to have been traded widely, rather, these sources were considered to be common grounds. The Neutral Indians occupied a territory along the east end of Lake Erie which was noted for its large deposits of chert (flint) but the Huron and Iroquois peoples visited the area in order to obtain the nodules (G. Wright 1967: 183, 187). Other examples which substantiate this pattern are the catlinite deposits of southwestern Minnesota which were "held and owned in common, as neutral ground, amongst different tribes who met here to renew their pipes" (Catlin 1926-II: 190) and the copper deposits of Lake Superior which were used until the late 1600's but for which there is no historical account of being traded in raw form (G. Wright 1967: 187). On the basis of the evidence, it would appear that during the early historical period, non-perishable raw materials were not part of the various exchange networks.

Among utilitarian and decorative items that were part of the exchange system in the early historic period were beads. Radisson mentions in 1658 that pottery was traded on Huron Island, but this is the only reference in the early accounts of the Great Lakes in which pottery was mentioned. As the Europeans became involved in the exchange systems, European items such as knives, hatchets, awls, glass beads, and copper pails rapidly became items of exchange (G. Wright 1967).

Trade was accomplished by means of developing formal social relationships, gift giving during major feasts or ceremonial rituals such as the Feast of the Dead, and through the automatic practice of gift giving to visitors (G. Wright 1967, 1968). Brebeuf's 1636 account indicates the nature of traditional Huron, familial exchange networks:

> Besides having some kind of Laws maintained among themselves there is also a certain order established as regards foreign Nations. And first, concerning commerce: several families have their own private trades, and he is considered Master of one line of trade who was the first to discover it. The children share the rights of their parents in this respect, as do those who bear the same name; no one goes into it without permission, which is given only in consideration of presents; he associates with him as many or as few as he wishes. If he has a good supply of merchandise, it is to his advantage to divide it with few companions, for thus he secures all that he desires, in the Country; it is in this that most of their riches consist. But if any one should be bold enough to engage in a trade without permission from him who is Master, he may do a good business in secret and concealment; but, if he is surprised, he will not be better treated than a thief--he will only carry back his body to his house, or else he must be well accompanied. If he returns with his baggage safe, there will be some complaint about it, but not further prosecution (G. Wright 1967: 183).

It is apparent, that formal trade relationships were developed between individuals, that these relationships were widely recognized, and that they were hereditary. It may well be that these were fictive kinship relationships although the data are not clear on this matter.

A variety of feasts were held where various ethnic groups met. The Huron, for example, had annual feasts, thanksgiving feasts, curing feasts, and feasts associated with death rituals (Trigger 1969: 93-112). Neighbouring groups and other ethnic groups took part in an intensive exchange of commodities during these feasts.

Trade friendships and gift exchanges appear to have been important mechanisms of economic transactions. It was customary for visitors to present gifts when entering a village, and for the recipient to accept any and all gifts regardless of value without any bartering or disagreement over value (G. Wright 1967, 1968). Evidence for this exchange custom persisting among Upper Mississippian tribes such as the Santee as well as the Great Lakes groups is evident in Radisson's account of the 1660 Feast of the Dead in Wisconsin in which much reciprocal gift-giving took place (Meyer 1967: 3). Rituals such as the Feast of the Dead resulted in a redistribution of goods both within and between tribal groups, a reaffirmation of friendship and alliances, an expression of generosity and concomitant prestige through giving, and the "loss" of some items through interment with the dead (G. Wright 1967: 192).

Trade networks in the Upper Great Lakes served to reduce the differential accessibility of resources. Among the traditional Native items that were being traded, were food items and perishable materials and items such as hemp, hides and rush mats as well as tobacco, herbs, and pigments. Large numbers of items such as hides served as important exchange commodities during numerous rituals. Ceremonial items were involved in trade relationships and mortuary activities. Despite the fact that items such as unperishable raw materials and ceramics were not important trade items, there were sufficient classes of materials to exchange across biomes that trade alliances were sufficiently important to warrant the development of fictive kinship relationships and frequent affirmation of friendship and alliances.

Northern Plains Trade Networks

To the south of the research region there were several trading centres in the early Nineteenth Century. The Mandan-Hidatsa villages along the Missouri River in North Dakota and the Arikara villages in South Dakota comprised the Middle Missouri System (Wood 1972: 157-159). The Cree and Assiniboin occupying Southwestern Manitoba and adjacent regions traded at these centres. The Teton also traded at these centres and set up a secondary Dakota Rendezvous in eastern South Dakota. The Middle Missouri System was linked indirectly to the Pacific Plateau System at The Dalles on the Columbia River and ultimately to the Pacific coast with groups like the Crow acting as middle men between the Middle Missouri System and the secondary Schoshone Rendezvous which probably occurred in southwestern Montana. Other groups such as the Cheyenne, Arapaho, Comanche, and Kiowa were middle men between the Middle Missouri System and the southern Plains (Ewers 1968; Wood 1972: Figure 1). The meeting of various groups at these trading centres provided the opportunity for groups such as the Cree and Assiniboin to interact with groups whose homeland was even more distant and to have access to certain items that these more distant groups had made or obtained.

Many of the groups involved in this Northern Plains trade network were relatively recent occupants. However, there is archaeological evidence to indicate that these networks may be very old and that the recent occupants merely replaced earlier participants in the trade system (Wood 1972: 158-161). Dentalium shell from the West Coast, Gulf Coast shell, and Great Lakes copper are examples of items that appear in Northern Plains sites for at least 1500 years prior to European contact.

Trade relationships were often developed between groups who were in conflict with each other except during actual trading ventures. Like the Great Lakes groups, the Plains groups developed a series of fictional relationships that protected trading partners, even if they were bitter enemies, as follows:

> A father-son adoption ceremony was the key mechanism . . . which enabled members of warring tribes to trade in peace. The Mandan were adopted by fictitious fathers, and in turn had adopted sons in tribes with whom they dealt. Rituals of adoption were part of the [ceremonial tribal trade]. Plains Indian trade was accomplished by barter between fictitious relatives. From a larger perspective, a vast network of ritual kinship relationships extended throughout the entire Plains (Bruner 1961: 201).

Before European contact, the horticulturalists along the Missouri River traded corn, beans, and other cultural products for meat and hides (Wood 1972: 159; Ray 1971: 68-69, 82-84). Individual trade was carried out by women and consisted mainly of foodstuffs and clothing whereas the men were involved primarily in ceremonial trade (Wood 1972: 159). Additional activities at these trading centres included:

a) dancing and various forms of social intercourse,

b) gambling which caused materials to exchange hands, and

c) the exchange of a wide variety of items such as tools, trinkets, folk tales, songs, dances and brides (Wood 1972: 164-165). These latter examples were considered as "items" in the sense that ownership, value, and rights of use were integral parts of the exchange.

The Plains trade activities produced similar relationships to those found in the Upper Great Lakes. Both subsistence and ceremonial items were exchanged. The traditional subsistence exchange involved primarily an exchange of animal protein by the nomadic hunters and gatherers for horticultural produce by the sedentary village populations. Trade was sufficiently important to warrant fictive kinship relationships and frequent affirmation of friendship and alliances.

Trade Networks and Southwestern Manitoba

The ethnohistoric groups who utilized Southwestern Manitoba were part of both the Upper Great Lakes and Northern Plains trade networks which acted as important distribution channels for a variety of items. They also resulted in regularized movement of groups over a broader range than had been the case if they were self-sufficient groups within their own environments. This latter point is important in understanding settlement distributions of either a region or a specific group. Furthermore, the exchange of materials increased the economic viability of various groups by providing alternative resources, e.g., corn to be used during periods of winter shortage by nomadic groups.

Postulate 9:

> Trade networks were an essential part of the economic redistribution of resources.

The ethnohistoric evidence for the Assiniboin indicates that they regularly visited the village tribes on the Missouri River during the autumn or early winter to trade hides and meat for horticultural produce (Ray 1974: 46-47). The Cree were also found in these villages (Ewers 1968: 14-17). The symbiotic relationships between the nomadic Woodland or Plains hunters and the village dwelling horticulturalists were important for survival during winter months.

The importance of trade networks has been largely ignored in chronological frameworks in archaeology primarily because:

a) many of the important commodities such as horticultural produce perish quickly,

b) the chronological approach emphasized diagnostic "index fossils" which were frequent and placed less emphasis upon small quanities of "foreign" items,

c) regional research without adequate knowledge of potential trade items such as lithic sources and a lack of communication between researchers in near-by regions has resulted in a loss of awareness of the mobility and degree of interaction that took place.

Given the importance of symbiotic relationships through trade, the identification of important items to historical groups in the prehistoric record is difficult. Perishable items do not survive. Lithic raw resources are not traded extensively. Small ceremonial items traded by men are most likely to be found. The importance of trade networks must be inferred primarily by their importance between areas of different resource potential. Since there was considerable variation in the resource potential from biome to biome and from season to season, the trade networks provided an important economic levelling mechanism.

The exchange networks have very important implications for understanding the social environment for any region. Their presence reflects considerable interaction, widespread movement throughout various ethnic territories despite hostilities, a much larger total "territory of use" by any individual ethnic group than is generally considered in territorial distributions, a necessary and important mechanism for reducing disparities due to environmental variability, and a mechanism for the exchange of ideas, objects and people.

CHAPTER 4

CERAMICS FROM AN ANTHROPOLOGICAL PERSPECTIVE

Introduction

The archaeological complexes under analysis here are those identified on the basis of ceramics. In order to define and understand the patterns of societal behaviour primarily on the basis of one part of the overall tool kit, it is necessary to understand how that part will reflect behavioural patterns of the societies in which it was produced.

There are no detailed ethnographic accounts of the Native pottery activities in Southwestern Manitoba compared to such Southwestern United States groups as the Papago (Fontana et al 1962). However, data from the accounts of early travellers and/or elderly informants provide insights into technological steps, socialization processes, and the appearance of traditional pottery.

The following data are based primarily upon groups who occupied the Northeastern Plains. Little information is available for most of the northern Algonquian groups since copper kettles preceded the fur traders and had replaced the ceramic vessels prior to intrusions of fur traders into the homelands of these groups. Traditions of pottery manufacturing have been recorded among such Northern Plains groups as the Assiniboin, Plains Cree, Arapaho, and Northern Shoshoni as well as the visitors to the Northwestern Plains such as the Kutenai, but the accounts are fragmentary (Ewers 1945: 297). The Blackfoot (Ewers 1945) and Gros Ventre

(Flannery 1953) accounts provide important insights into Northwestern Plains ceramic technology. Traditions of the village-dwelling Pawnee, Arikara, Mandan, Hidatsa, and Cheyenne of the Central and Northeastern Plains demonstrate differences in manufacturing techniques, functional variability, and importance in ceramic technology.

The Potters' Perspective

A number of generalizations can be made about potters at the band or tribal level of social organization.

Postulate 10:

Most of the pottery was manufactured by the women.

Lowie (1920: 75) stated that "wherever earthenware is manufactured by hand, it is produced by the women, while the wheel-turned pottery is made by the men." Linné (1965: 20-21) noted that among American Indians, pottery making was virtually the exclusive occupation of women in tribes which were not part of the "high cultures", i.e., had not reached more complex levels of social organization such as the state level of the Incas. Women are reported as the manufacturers among the Mandan (Catlin 1857: 116; Maximilian 1906: 278-279), Hidatsa (Maximilian 1906: 278-279; Bowers 1965: 104, 120, 165-166), Arikara (Bradbury 1904: 169; Denig 1950: 206-207; Gilmore 1924: 286-288), Pawnee (Neuman 1955 citing Dunbar 1888: 279; Grinnell 1961: 255-256; Weltfish 1937: 154), Cheyenne (Grinnell 1923: 235-241), Gros Ventre (Flannery 1953: 65-66), Catawba and Cherokee (Holmes 1903: 53-56), and Papago (Fontana et al 1962: 19-83).

There are indications that transfer of knowledge was along the female line, specifically from grandmother to grand-daughter among some groups; one of Flannery's (1953: 65-66) Gros Ventre informants reported having been shown how to make a vessel by her grandmother. Pottery skills were also passed from grandmother to grand-daughter among the Arikara and Mandan peoples. Most Papago potters were also taught by their mothers or grandmothers (Fontana et al 1962: 19-22).

There is evidence, however, that among the Blackfoot, men made the ceremonial vessels for pemmican used during feasts (Ewers 1945: 294). These vessels were unfired, painted with red earth paint, and stored carefully in rawhide slip covers. Manufacturing of these ceremonial vessels may have survived, along with other elements such as the ceremonial lance and the wooden bowl, after ceramic technology as a whole had ceased (Ewers 1945: 296).

Postulate 11:

> Pottery manufacturing was part of a familial mode of production; i.e., women were expected to learn how to make pottery and the vessels were manufactured primarily, if not wholly, for use by the family group.

As Sahlins (1968: 74-95) has pointed out, production in tribal societies is a domestic function in which the family unit is largely responsible for its own production to meet its own needs. Labour specialization is only along the lines of age and sex. Among hunting and gathering societies, objects which are made and utilized by an individual are frequently regarded as private property (Service 1966: 22). Items such as pottery were made to meet the demands of personal utilization and were therefore primarily for the use of the manufacturer.

One must bear in mind, however, that all women were not equally adept at pottery manufacturing, and in some groups individuals became part-time specialists and traded their pottery to other women. Some women may have specialized in pottery manufacture among the Mandan (Bowers 1950: 91-92), and among the Hidatsa, pottery manufacturing was confined to a relatively few families who traded the vessels for other items (Bowers 1965: 120, 165-166).

Among the Hidatsa, however, pottery manufacturing was associated with women of a relatively few families who had specific ceremonial bundles (Bowers 1965: 104, 120, 165-166, 373-374). These specialists made pottery as part of secret and sacred activities. The vessels were traded with other women in the community for things that the families did not have. The Hidatsa were the only group on the Northern Plains for which there is evidence that specialization was pronounced and ceremonially sanctified.

Potter as Craftsman

The stages of pottery manufacture remained the same for all tribal potters although procedural choices varied form society to society. Krause (1972: 89-105) compiled a series of conceptual and procedural modes to which an Arikara potter would be expected to respond (see Appendix B). An understanding of the various technological stages of manufacturing and a knowledge of some of the known responses is necessary in determining important attributes.

Selecting the Raw Materials

The vessels were made from a mixture of clay which often had some form of aplastic or tempering added. The composition of the clay affected its malleability and reaction to firing. While pre-European North American potters lacked scientific knowledge of clay composition, criteria such as colour, consistency, and taste were important in choosing clays (Fontana et al 1962; Shepard 1971: 50-51; Arnold 1971). The difficulties of working with clays different from those that a potter is used to is dramatically portrayed in "Ollero Yucateco" (Sims et al 1963), a film study of a Mayan potter at the University of Illinois.

The preference for certain clays was evident among the Arikara who chose deposits of a fine, tenacious clay located in certain places in the upper Missouri River Region (Gilmore 1924: 286-288), among the Mandan who selected a tough black clay (Catlin 1857: 116), among the Hidatsa who chose a dark slate coloured clay, in the exposed clay banks near the villages (e.g., at Fishhook Village, clay was obtained from beds immediately above and below a lignite vein about four miles northwest of the village (Bowers 1965: 165), among the Cheyenne who chose clays of a variety of colours producing vessels of a variety of colours (Grinnell 1923: 237), among the Gros Ventre who selected a blue clay near Hayes, Montana (Flannery 1953: 66), and among the Piegan who chose sticky clay around the elk licks (Ewers 1945: 294). The relative importance of the various clay colours for recognizing superior clays and the chemical advantages of the various clays is unknown.

The tempering materials were chosen to reduce shrinkage (Shepard 1971: 24-31, 53-54). The potter had to balance the advantage of different tempering particles against the reduced strength of vessels due to their inclusions. The composition of the clay affected the amount of tempering required since some clays did not dry without cracking unless tempered.

The choice of tempering materials appeared to be culturally determined. Despite the ubiquitous distribution of sand, granites, and shell, a preference for grit tempering was evident in ceramics around the Upper Great Lakes, whereas shell tempering was more frequent in the American Southeast (Jennings 1974). To the southwest of the Upper Great Lakes, Woodland peoples with grit tempered pottery and Mississippian peoples with shell tempered pottery co-existed in the same environment with the same resources. Among the Plains groups, pulverized flint or granitewas preferred by the Hidatsa and Mandan (Maximilian 1906: 278-279), crushed graniteor sand by the Cheyenne, Arikara and Pawnee (Gilmore 1924: 286-288; Grinnell 1923: 236-238, 1961: 255-256), as well as the Blood, Blackfoot and Piegan (Ewers 1945), while white pulverized flint (about 6% of the paste) was preferred by the Gros Ventre (Flannery 1953: 66). One source of grit tempering was the granitic rocks that had become friable due to repeated re-heating in the sweat lodges (Gilmore 1924: 286-288). The various uses of the term, flint, must be viewed with caution, it may refer to any fine grained material or almost any rock, and has no geological validity.

Grease was sometimes mixed with the clay-tempering material. Grease or "buffalo" tallow was reported for the Cheyenne (Grinnell 1923: 237); this grease was produced by boiling the hide of a bison-bull's head in a clay-lined pit of water and skimming the scum from the surface.

Building the Vessel

A variety of techniques were used to build a vessel, of which modelling, moulding and coiling, or some combination of the above, were the widespread methods (Krause 1972; Shepard 1971). Modelling involved working a lump of clay into the general shape of the vessel or into some part of the vessel such as the base and body as high as the shoulder. The Cheyenne modelled their vessels as follows:

> . . . taking a lump of the mixture they shaped it with their hands, first making a depression in it, and with a fine smooth stick they patted out the inside of this depression until it was large enough; then with the stick they patted it all over the outside surface, and smoothed it (Grinnell 1923: 236).

Denig (1950: 206-207) reported that in the mid-1800's the Arikara modelled the vessel by hand from a lump of clay, working it from the bottom upward until it was the approximate shape of the vessel, then thinning and finishing it using a cobblestone on the vessel interior and a flat wooden club about eight or nine inches long on the exterior. Maximilian (1906: 278-279) reported a similar technique for the Mandan, Hidatsa and Arikara in which a stone was used on the inside and a piece of poplar bark was used to work and smooth the exterior.

Among the Blackfoot, Blood, and Piegan tribes, several techniques have been reported. One Blood informant reported that vessels had been built by hand without the use of moulds (Ewers 1945: 294).

Moulding involved building part of a vessel over another vessel or object or using two split moulds with a vertical juncture. In the Western Hemisphere, this latter technique was confined to Peru and Mexico. The Pawnee are reported to have smoothed off the end of a tree to make a mould over which the clay was evenly spread (Grinnell 1961: 255-256). This account is highly unlikely since Pawnee pottery was narrower at the mouth than at the bottom which would have required carving the mould in the exact form and burning out the mould.

Two different mould techniques were employed by the Blackfoot, Blood, and Piegan. The ceremonial cylindrical vessels were made by lining the interior of a buffalo skin or rawhide container with a clay mixture by both the Blackfoot and Piegan (Ewers 1945: 293-294). A Blood account involved digging a hole in the ground, lining the hole with clay, placing a stone in the base of the hole, using the clay-lined hole as a mould, placing a stone in the vessel snugly, and heating the stone to fire the vessel (Ewers 1945: 293-294).

A variant of the mould technique was the use of a woven container as an exterior mould to provide shape. In 1811, Bradbury asked an Arikara woman how vessels were made and she "brought a basket, and took some clay, which she began to spread very evenly within it, showing me at the same time that they were made in that way" (Bradbury 1904: 169). Grinnell (1961: 255-256) reported that, according to Dunbar, the Pawnee used a willow twig framework as well as modelling, and that the framework was burned off. A Gros Ventre account describes pasting the clay-temper mixture over a framework of woven sinew (Flannery 1953: 66).

Krause (1972) discounts Bradbury's account because Denig and Gilmore's later accounts gave evidence only of modelling techniques using the paddle and anvil technique, and the pottery found in historic Arikara sites lacks wicker impressions but commonly includes exterior trough and ridges of simple paddle modified impact and interior anvil impressions. However, Bradbury's observations should not be rejected uncritically since he was very observant, curious, and one of the few travellers to witness the manufacturing of a pot.

The archaeological record indicates that cord-roughened pottery is a minority element in Pawnee-Arikara ceramics. Deetz (1965: 1-3, 38-45, 55-57) analyzed the pottery from the Medicine Crow Site, South Dakota, an Arikara occupation dating A.D. 1690-1780, and he found only one cord-roughened sherd in a sample of 2,500 rim sherds. In samples of possible Arikara ceramics where "roughened" surfaces have been noted, the surface finish has been identified as simple stamped or smoothed-over simple stamped (Lehmer and Jones 1968; Lehmer 1971).

The archaeological record raises problems with some of the historical observations. Were observers such as Bradbury dealing with a woman who had learned her skills in another tribe? Were Dunbar's informants guessing? Have some archaeological specimens with cord-roughened surfaces been inadvertently identified as smoothed-over simple stamped pottery?

Samples of Plains archaeological ceramics outside of the villages of the Middle Missouri Sub-area provide evidence that textile impressions were important (Syms 1974a, 1974b, 1974d; Byrne 1973). While many reports on prehistoric ceramics have been concerned primarily with decorative variation on small rim fragments, recent reconstructions of vessels from the Snyder Dam, Snyder I, Snyder II, and Brockinton sites of Southwestern Manitoba as well as vessels from the forested areas of Manitoba and northern Minnesota show that vessels were being formed within textile containers and/or wrapped in large pieces of textiles (Syms 1974d). Much more research is required to clarify the importance of wicker and textile moulds.

Coiling involved building a vessel by using successive rings of clay. It utilized either a spiral coil or a series of successive rings. While vessels frequently broke along coil junctures, the absence of coil breaks cannot always be interpreted as an absence of coil technique.

Modifying the Vessel Surface

Once the vessel was formed, it was frequently modified prior to firing by working on the surface finish and/or by adding decorative elements. The surface was scraped, rubbed, polished, or painted depending upon the cultural norms of the specific societies and possibly the function of the vessel. Materials used to modify the surface included water-worn pebbles of specific shapes, squash rind, corn cob or bone tools (Shepard 1971: 65-68). The clay surface, tool or fingers were dampened sometimes and the surface smoothed or polished.

Major distribution patterns indicated areal preferences for smoothed, unsmoothed, and polished surfaces. The sedentary historic groups from the American Southwest, the Southeast, and the Plains Missouri Valley produced smoothed or polished vessels. In the Late Prehistoric Period (post A.D. 800), smoothed or polished vessels were produced by these groups as well as the Iroquois, the Siouan Oneota complex, and the Mississippian cultures. In contrast, the Late Prehistoric archaeological cultures of the northern Boreal Forest produced pottery with a variety of unsmoothed fabric impressions.

The decision to finish a vessel in a particular manner appears to be primarily cultural although functional and technological variables such as choice of clays may have been operative. The tendency among sedentary groups for pottery to be smoothed and pottery among nomadic groups to be unsmoothed or smoothed in lesser frequencies, may reflect the time available or selective utilization of particular clays by the sedentary potters.

The vessels were generally decorated while the clay was in the plastic or leather-hard state. Decorative techniques included a variety of applications such as incising, making boss and punctate impressions with sticks or bones, impressing the clay with a variety of fibres or cords, applying dentate patterns with notched objects, impressing objects into the clay to produce a variety of tool impressions, altering the clay surface with fingers, and adding tabs, handles, or fillets.

All of the sedentary Middle Missouri tribes decorated their pottery using either sharp stones or pointed and edged wooden tools to produce incised designs (Grinnell 1961: 255-256; Wood 1962) or by modifying the lip with the fingers. In his analysis of incised decorative designs on pottery from a number of Late Prehistoric and Historic Plains village sites, Wood (1962) concluded that:

a) there was a rigid, stylized geometric, rectilinear Plains style that was characteristic of female Plains Indian art form,

b) there was a basic unity and similarity, both temporally and geographically, that indicated a Central Plains influence which probably originated with Mississippian groups, and

c) the artistic expression was confined to a band of repetitious design elements encircling the vessel between the neck and the shoulder angle.

Firing the Vessel

Before a vessel was fired, it had to be carefully dried to prevent excessive shrinkage and cracking. The Arikara set the vessels away for 24 hours in a place sheltered from air currents and jarring (Gilmore 1924: 286-288). Drying was also recorded for the Cheyenne but the amount of time was not stated.

Firing was the inevitable test which determined the potter's success (Shepard 1971: 74). Kilns were reported for the Mandan (Catlin 1904: 116) and Cheyenne (Grinnell 1923: 237); the latter was described as a hole in the side of a hill forming a kind of oven. The kiln was filled with wood and lighted, the coals and ashes were removed, the pots were placed in the kiln, and the mouth of the kiln was sealed with a large rock (Grinnell 1923: 237). There is some inconsistency in this account since the warmth of the kiln would not have been adequate for firing the vessels. Either the vessels were placed among the coals and covered with ashes or a new fire would have been constructed.

The other firing technique was to cover the vessel with fuel or the coals and ashes of a fire. The Arikara technique was reported as follows:

> . . . a fire-bed of sufficient size, made of dry elmwood, was laid. After kindling, this was allowed to burn to a good bed of coals. A place was hollowed out in the coals and the pot carefully placed therein. Then the coals were heaped around in the pot, and more dry elm was laid on and around the pot, sufficient to make it red-hot. (Gilmore 1924: 286-288).

The Pawnee buried their vessels in ashes (Weltfish 1937: 154), the Mandan, Hidatsa and Arikara filled and surrounded their vessels with dry shavings (Maximilian 1906: 278-279), and the Cheyenne covered their vessels with bark from dead trees (Grinnell 1923: 236). The Blood account involved placing a stone in a sun-dried vessel and heating the stone (Ewers 1945: 293-294).

After the pot was fired, the clay often changed to a yellowish-red colour (Maximilian 1906: 278-279). The vessels were then rubbed with grease to give a black or grey, glossy appearance (Gilmore 1924: 286-288).

Form and Function of the Vessels

Plains pottery was primarily globular, utilitarian ware, and was used for cooking or storage (Wood 1962). Cocking reported that the Gros Ventre occupying the Saskatchewan River in 1772 made vessels of the same form as Newcastle pots without feet (cited in Burpee 1908: 111).

Descriptions of the Plains village tribes indicates considerable formal variability. Denig (1950: 206-207) reported that the Arikara made vessels in the shape of "pots, pans, porringers and mortars for pounding corn." The Cheyenne, who were still using ceramic vessels as late as 1851, reported six different forms which included globular vessels with flared rims, shallow platters, shallow cups or plates, and cylindrical jars, (Grinnell 1923: 236-239). Catlin (1857: 116 in Newman 1955: 16) reported that the Mandans modelled their clay into a thousand forms and tastes, but this statement obviously is exaggerated since the archaeological sites do not have this variation in form.

Several forms of pottery were present on the Northwestern Plains. Blood accounts referred to cooking pots with constrictions near the top around which handles were wrapped, flat dishes, and cylindrical ceremonial vessels (Ewers 1945: 293-294). The latter were used by the Blackfoot and Piegan too, and had flat bases, straight sides, thick walls, sometimes slightly wider at the mouth than the base, and two sets of holes on opposite sides for attaching handles. Larger forms of these cylindrical vessels were known to have been fired and used for cooking (Ewers 1945: 295).

Despite the incomplete ethnohistoric record regarding Plains ceramics, the available literature, the nature of the technology and physical environment can be combined to develop initial insights of the role of pottery manufacturing in understanding Plains archaeology beyond the use of decorative motifs, rim profiles, and vague categories of tempering. Further evidence must await the results of refined ceramic analysis and experimental research.

Postulate 12:

> Various ethnohistoric groups had ceramic technologies with distinctive traits of clay sources, tempering choices, manufacturing techniques, form, function, and firing techniques.

This postulate requires no further discussion since the entire section on Potter as Craftsman has indicated the technological variability that occurred among groups of potters, particularly on the Northeastern and Northwestern Plains. There is, however, one additional postulate that requires further discussion.

Postulate 13:

> Ceramics of the horticultural groups were more diversified than were the ceramics of the nomadic groups.

The ethnohistoric evidence is based upon observations of the Arikara and Mandan of the Missouri River and tribes of the Blackfoot confederacy (Denig 1950; Catlin 1857; Ewers 1945). Not only did the horticultural tribes have additional items such as mortars for grinding corn, they had a tremendous variety of shapes of pots.

The ceramic record for the Late Prehistoric Period on the Plains substantiates the differences in variation of form. Samples from village sites included a tremendous variety of vessels with flared, collared, S-shaped, filleted, and arcaded rims with tabs and handles attached to some (Wood 1967; Wedel 1961; Grange 1968; Lehmer 1971). Vessels from the less sedentary Dismal River sites and from Western Canadian Plains sites tended to be globular with flared rims that lacked handles, decorative additions, and rim variations (Wedel 1961; Byrne 1973; Syms 1974e).

Postulate 14:

> Pottery manufacturing was a seasonal occupation for groups living in Southwestern Manitoba.

The manufacturing of pottery was limited by the need for clay, water, and warm weather. Collecting clay took place only from late spring to late autumn; even mild temperatures during late September are sufficiently cool to limit working with cold, damp clay to a very brief period (Corenblum[9] 1975: personal communication). Ceramic manufacturing during other seasons was limited to clay that had been packed and carried about with other supplies. Quantities of such clay would likely have been limited since clay and tempering is heavy and bulky.

This postulate provides the basis for a series of questions related to the density of ceramic fragments in sites. If vessels were not being made throughout the winter season, would winter and/or spring sites have had fewer vessels due to normal day-to-day attrition? Would winter sites have had a higher rate of vessels with mend holes? Would winter sites contain primarily a few large cooking vessels in contrast to summer sites that might contain vessels with other functions? These questions require controlled sampling, vessel reconstruction, and comparative data that are not currently available.

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[9] Sylvia Corenblum is conducting experimental research with ceramics from western Manitoba.

Conceptual Schemes and Classificatory Problems Relating to the Cultural History of Southwestern Manitoba

The study of the ceramic complexes of Southwestern Manitoba must ultimately rely heavily upon analyses of the cluster of tools and other materials that represent the remains of past communities. These remains must be analyzed at a minimum of four levels:

a) the traits of objects as expressions of decisions that people have made,

b) the classification of objects as clusters of traits,

c) the classification of the cluster of objects as some representation of past populations and their activities, and

d) the processes by which these various groups adapted to their environment.

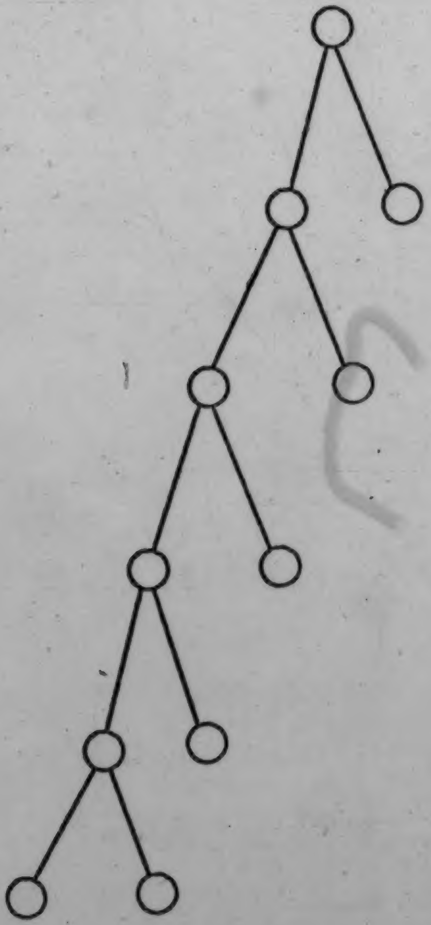
Various conceptual models have been used in the past and are still in use for materials that are of comparative importance in understanding the cultural history of Southwestern Manitoba. A brief review of the terminology used in these conceptual schemes is necessary to prevent confusion in Chapters 5 and 6 where the interpretations of these schemes are compared and interrelated. Also, definitions of the specific classificatory and conceptual terminology used here is required.

Models of Cultural History in Manitoba Prehistory

Throughout the last 30 years, the identification and interpretation of the archaeological record in southern Manitoba has undergone marked terminological and conceptual changes. The first effort to organize Manitoba archaeological remains into a general framework was made by Chris Vickers (1945, 1947, 1948, 1949). He adopted certain terms from the Midwestern Taxonomic System (such as "focus" and "aspect") as used by Wilford (1941) in Minnesota and attempted to relate the record from Manitoba to that from Minnesota.

The Midwestern Taxonomic System (MTS), as originally stated by McKern (1939), called for the classification of archaeological units into an hierarchical framework solely on the basis of the degree of similarity of form (Figure 10). Vickers combined the classificatory units as defined by Wilford with an interest in the Direct Historical Approach advocated by Strong (1940) to develop a chronological framework for southern Manitoba (Figure 11). There were no radiocarbon dates nor large scale research projects during this period; Vickers developed his chronology by testing sites, mainly in south-central Manitoba, in his own spare time and the spare time of other interested individuals. At several sites, he found that the Rock Lake Focus of the Rainey River Aspect was stratigraphically beneath the Manitoba Focus of the Headwaters Lake Aspect and was able to develop chronological relationships on the basis of relative dating. Since Vickers lacked radiocarbon dates to provide a temporal framework, he proposed a Ceramic Period with little temporal depth.

In the early 1950's, Richard S. MacNeish constructed a chronology of "cultures" for southern Manitoba (MacNeish 1954, 1958; MacNeish and Capes 1958). He excavated nine sites in eastern Manitoba (primarily along the Red and Winnipeg Rivers), one site in south-central Manitoba, and one site in western Manitoba. From these data plus the results of Vickers' research and study of numerous collections, he formulated a stacked chronology of archaeological foci or "cultures" (Figure 12). While the term "focus" was maintained, the concept was now applied to a cluster of artifacts with a distinct time span.



Taxonomic Level	Examples of Levels
Base	Most fundamental traits of subsistence categories (e.g. Horticulture-Pottery Base, Seed-Gathering-Basketry Base)
Pattern	Series of traits reflecting primary adjustments to environment (e.g. Mississippian vs. Woodland Pattern)
Phase	Similarity in ceramic technology, general house-type or burial pattern
Aspect	Overall similarity of pottery decorative motif with a variety of expressions
Focus	Group such as a local tribe having pottery with identical decorative motif
Component	Expression of a focus at a site

Figure 10. Classificatory Units of the Midwestern Taxonomic System (MTS) McKern 1939).

Time Division	Aspect	Focus[a]	Site	Estimated Date	Ethnic Identity	Comments
Historic Period (ca. 1670-1870)	?		E. St. Paul Grave	1850	Saulteaux?	
	Headwaters Lake	Manitoba	Snart	1768-1794	Assiniboine	
	Rainey River	Rock Lake	Kreiger	1760	Algonkian?	
Ceramic Period (ca. 1400-1670)	?	Pelican Lake	Lowton	1600-1650	?	Upper Missouri connections
	Headwaters Lake	Manitoba	Stott	1670	Assiniboine	
	Headwaters Lake	Manitoba	Avery #1	1600	Assiniboine	
	Headwaters Lake & Rainey River	Manitoba & Rock Lake	Rock Lake Mounds		Siouan?	
	Headwaters Lake & Rainey River	Manitoba & Rock Lake	Calf Mountain			Rock Lake Focus earlier
	Rainey River	Rock Lake	Montroy	1620	?	Rock Lake Focus earlier
	Rainey River	Rock Lake	Avery #2	1500	?	
	Red River	?	Sykes Mound		?	
	Red River	?	McKay Mound		?	
Preceramic Period (prior to 1400 A.D.)	?	?	Lake Shore		?	
Unnamed Period (ca. 8000 B.C.)					?	Folsom and Yuma points

(a) Terms "focus" and "culture" used interchangeably.

Figure 11. A Composite Archaeological Chronology for Southern Manitoba by Vickers (1945, 1947, 1948, 1949, 1950, 1951a).

MacNeish Chronology			Comparable Vickers' Foci	Other Affiliated Foci
Foci	Estimated Dates	Ethnic Identity		
Selkirk Focus(a)	A.D. 1350-1750	Cree		
Manitoba Focus	A.D. 1000-1350	Assiniboine	Manitoba Focus	Blackduck Focus (Minnesota) Melita Focus
Nutimik Focus	A.D. 500-1000		Rock Lake Focus	Malmo Focus (Minnesota)
Anderson Focus	500 B.C.- A.D. 500			
Larter Focus	1500 B.C.- 500 B.C.			
Whiteshell Focus	3000 B.C.- 1500 B.C.			

(a)The terms "focus" and "Culture" were used interchangeably.

Figure 12. A Comparison of Chronologies by MacNeish and Vickers.

MacNeish was faced with the momentous task of excavating, analyzing, describing, and publishing the data on the "cultural history" of Manitoba on the basis of only three seasons spent in the field. He faced, as well, the problem of excavating multi-component sites in which all or most posed the difficulties of collapsed stratigraphy; i.e., mixing of occupations occurred among all or most components producing, at best, trends in changing frequencies of tool types. He generally chose to excavate these sites with collapsed stratigraphy in arbitrary six-inch levels (MacNeish 1958: 15, 27, 34; MacNeish and Capes 1958).

The temporal estimates assigned to these foci were hampered by the fact that he did not have any materials dated. Furthermore, there were no previous dates from Manitoba sites that could be used. MacNeish (1958: 51-55) was forced to build his temporal model on the basis of a limited number of dates from the Northern Plains and the Ohio River Valley.

When this new chronology of cultures was established, all artifacts were assigned to a new series of types and all but one of the foci were assigned new terms. For example, what MacNeish described as the Parkdale Eared projectile point type for Manitoba, was called the Oxbow type elsewhere on the Canadian Plains (Nero and McCorquodale 1958); what he defined as the Larter-tanged projectile point is known elsewhere as the Pelican Lake point type (Wettlaufer 1956; Reeves 1970a, 1970b). Some of these descriptive types have remained in the literature but, as the discussion in Chapter 5 indicates, many of the local Manitoba terms have been replaced by more commonly used terminology.

The emphasis in Manitoba archaeology during this era was confined almost totally to artifact description and classification, definition of archaeological foci or "cultures", and placement of these in a stacked chronology. The chronology was based primarily upon materials from sites with collapsed stratigraphy which required arbitrary sorting of materials into various foci. Since the foci were defined on the basis of materials from mixed components that had been excavated in arbitrary levels, the foci definitions reflected this mixture in a series of gradual shifting frequencies of types rather than as possible discrete clusters of types; it was impossible to know if each focus represented a stage in a local development, if there were distinctive groups moving in and out of the area, or some combination of the two. Compared with developments elsewhere in North America, this preoccupation with chronology was symptomatic of the early Classificatory-Historical Period (1914-1940) and to a lesser degree of the latter part of this period (1940-1960) (Willey and Sabloff 1974: 131-135).

In contrast to the emphasis upon artifact typology, there was relatively little concern or effort devoted to subsistence. Vickers (1950) did list the range of animals found at several sites (such as the Snart Site), but most subsistence activities were inferred from ethnohistoric accounts.

MacNeish (1958: 175-178) attempted to reconstruct subsistence activities from his earliest Whiteshell Focus to his late Selkirk Focus. He confined his faunal analysis primarily to the Lockport and Larter Sites; failed to collect faunal remains at other sites (e.g. Stott Site); attempted to identify many of the materials on his own which resulted in some misidentifications (e.g., elk was incorrectly identified as bison in the Whiteshell Focus levels at the Cemetery Point Site [Syms 1969]); and interpreted shifts in subsistence emphases using remains of fauna from different environmental zones. On the basis of the faunal remains from one excavation level at the Cemetery Point Site which lies within the Boreal Forest along the Winnipeg River, and several levels of the Lockport and Larter Sites which lie along the Red River in a Grassland environment, MacNeish (1958: 175-178) postulated a shift from Plains bison hunting associated with the Whiteshell Focus to hunting of large game such as moose, deer, bison, bear, wolf as well as fishing and collecting fruit and wild rice associated with the Selkirk Focus. He ignored the fact that the Boreal Forest and Grassland biomes had different contemporary faunal resources. The tendency by MacNeish to confuse horizontal multiple-biome variability with vertical, temporal change plus the mis-identification of faunal remains resulted in interpretations that must be considered with skepticism and caution.

MacNeish's chronology and accompanying artifact typologies was the only archaeological model available for Manitoba for many years and is still the basis for several recent reports (Hlady 1970b; Jamieson 1974). Mayer-Oakes (1970) introduced a new conceptual framework. Using the Willey and Phillips (1958) terminology, Mayer-Oakes shifted to the more flexible concept of the phase; from a purely stacked chronology to one of temporally overlapping phases or "cultures"; and placed more emphasis on differential adaptations with respect to resource potential (Figure 13).

Willey and Phillips defined the term "phase" as:

> . . . an archaeological unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived, whether of the same or other cultures or civilizations, spatially limited to the order of magnitude of a locality or region and chronologically limited to a relatively brief interval of time. (Willey and Phillips 1958: 22)

They state that a "phase" is approximately equivalent to the MTS term "focus",

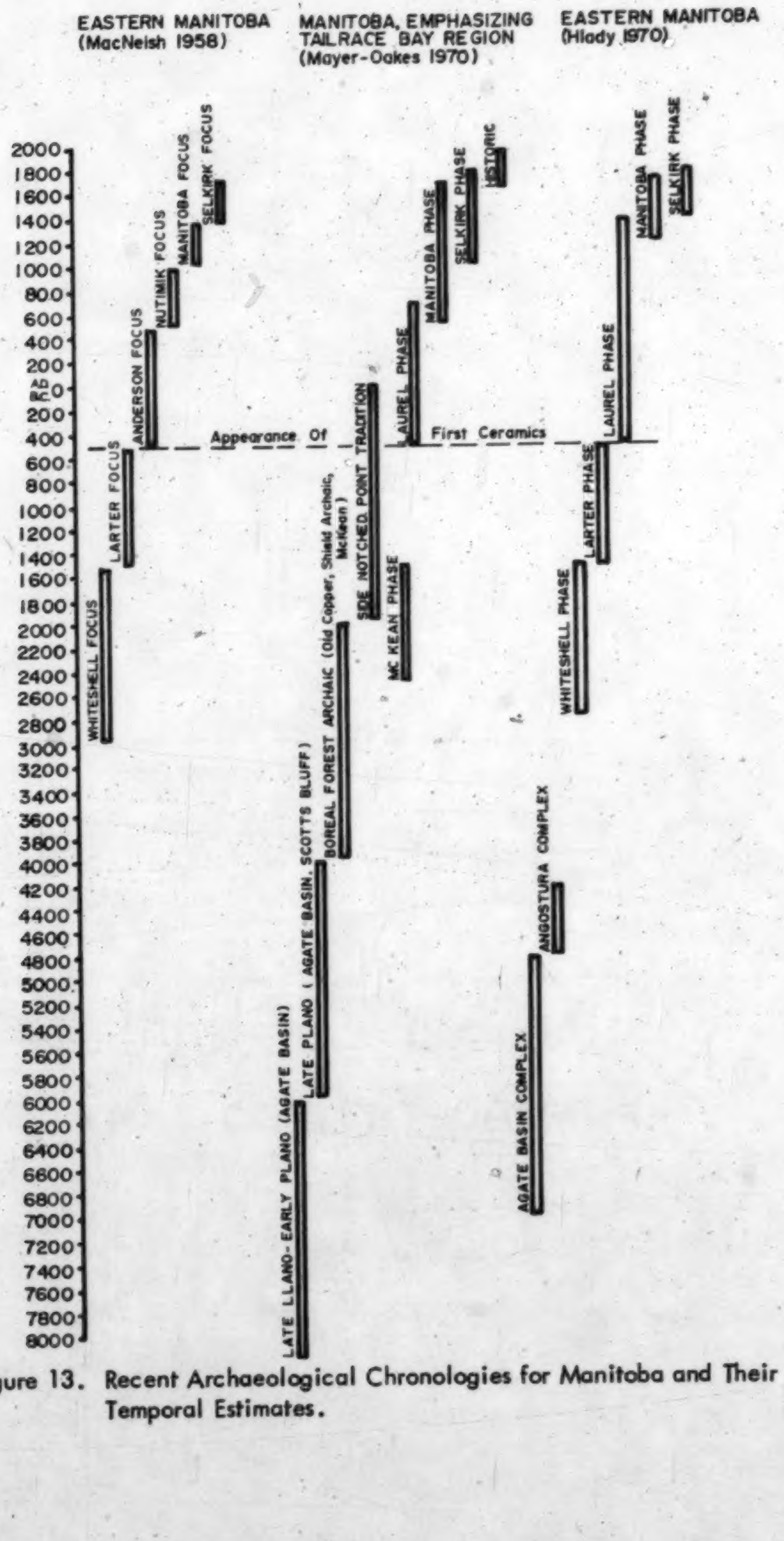


Figure 13. Recent Archaeological Chronologies for Manitoba and Their Temporal Estimates.

with an emphasis upon the temporal trait. However, the use of the two terms in Manitoba archaeology is virtually identical since both Vickers and MacNeish included the temporal dimension in their use of "focus".

Mayer-Oakes' (1970) project involved a rapid survey, extensive salvage excavations at the Tailrace Bay Site, and a few test pits at five other sites. He was hampered by a very modest research budget in attempting to excavate what was apparently a multi-component site in which the stratigraphy was collapsed and the upper levels disturbed by cultivation. Despite these limitations, the main site was excavated by natural levels during the second season and the faunal remains were identified, quantified and interpreted within the framework of the behavioural patterns of the living species. The faunal analysis conducted by Lukens, Jr. (1967, 1970) represents the first serious effort to evaluate the Manitoba archaeological record within an ecological framework using the faunal remains rather than ethnographic analogy. However, due to lack of contextual clarification, the faunal remains for several phases were lumped as a single unit.

Mayer-Oakes lacked dates from his excavations but had several dates from excavations within the province and more numerous dates from outside the province upon which he could develop his temporal estimates for the various phases. It must be emphasized, however, that all temporal estimates of the various archaeological units in Manitoba have been hampered by a paucity of dates. Mayer-Oakes' regional sequence involves a shift from a stacked chronology to a chronology of overlapping phases; the latter implying the co-existence of a limited number of groups responsible for different archaeological complexes.

However, he used many of the same classificatory units as MacNeish, or similar units with different names (e.g., combining Anderson and Nutimik foci into Laurel phase), and utilized MacNeish's data uncritically. Since Mayer-Oakes' materials were also located in collapsed stratigraphies, he chose index types and relied heavily upon MacNeish's data which had been arbitrarily sorted from sites with collapsed stratigraphy.

The chronologies established by MacNeish and Mayer-Oakes have been subsequently modified with respect to temporal estimates, but much of the artifactual data is based upon surface materials, unanalyzed test excavations, or data from sites with collapsed stratigraphy (Joyes 1969; Hlady 1970a, 1970b, 1971b). The developments of the latter part of the Classificatory-Historical Period (1940-1960) elsewhere in North America included an increased emphasis on context and function, settlement patterns, relationships between "cultures" and the resource base of the environment, an emphasis upon re-creating the context of the past by means of incorporating data from a variety of disciplines such as geology, botany, pedology, and a shift to ever-widening cross-cultural comparisons (Willey and Sabloff 1974: 131-177). Research in Manitoba did not follow similar developments for the same period.

The present regional research in Southwestern Manitoba, and regional research at Southern Indian Lake and associated river systems in the 1970's, represent the first efforts to break from the primarily chronological orientation in Manitoba. The development of new conceptual models and research designs, the increasing utilization of data from a variety of scientific desciplines, and a concern for temporal control, are resulting in a corpus of data that is more amenable to deriving cultural processes.

Selection of Traits and Typologies

Archaeologists must describe and classify artifacts in order to define complexes, reconstruct prehistoric lifeways, and/or attempt to determine the processes that account for prehistoric patterns of behaviour. Approximately 35 years ago, Kluchhohn (1939) criticized American archaeologists for proliferating typologies without making explicit the methodologies and theoretical implications upon which these typologies were based. Since then, the literature dealing with the various aspects of classification has become extremely abundant.

The traditional first step in archaeological classification is the definition of types. Rouse (1972: 48) defines a type as a "cluster or pattern of attributes that distinguishes a group of specimens and that defines them as a class." He distinguishes between a class, a group of artifacts which have been lumped together because they share certain diagnostic attributes, and the type, the cluster of diagnostic attributes abstracted from the artifacts. Read (1974) argues that:

a) types must not overlap,

b) the class of artifacts making up a type must be treated as a unit,

c) each type must be as large as possible,

d) on the other hand, the finer the classification, the more information available,

e) accuracy of classification depends upon correct placement of artifacts in the classes and the subsequent definition of the types, and

f) the interpretations and inferences are only as good as the typology.

Several procedures may be followed to arrive at a classification. Rouse (1960) differentiated between an analytical approach in which artifacts are assigned to successive classes on the basis of criteria such as technology, decoration and function, and a taxonomic approach, in which classes of artifacts are broken down into sub-classes (Figure 14). The latter method has also been referred to as a dendritic classification and has been achieved using a variety of techniques from hand sorting to associational analysis with a computer program (Whallon 1972).

Furthermore, there are several typological levels in many classifications, particularly those relating to ceramics. MacNeish (1958: 138-174) defined two levels, a broad typology which he referred to as wares, and a series of types within each ware. With the possible exception of surface finish, his ware categories were not mutually exclusive with respect to most of the traits used to define them. The types within each ware were defined primarily on the basis of decoration.

Other classifications of ceramics involve the type-variety concept (Gifford 1960), in which types are viewed as an abstraction of behaviour from the individual or small social group, while the variety represents variability within the type. This concept raises the issue of whether or not types represent cultural reality.

The issue of cultural reality varies from those who conceive types as purely arbitrary constructs (Ford 1954); as having reality as folk taxonomics but the researcher being uncertain whether he/she has discovered that taxonomy (Krieger 1960; Willey and Phillips 1958); and as cultural units that can be identified (Chang 1967b; Gifford 1960)(Maas 1968). Gifford (1960: 342-346) argues that classification for the sake of classification is not justifiable and that the types should be the manifestations of ideas or ceramic images held by the potter. Clearly, this latter view is desirable and should be achievable through testing and re-testing of typologies from various sites. At Cahokia, for example, the

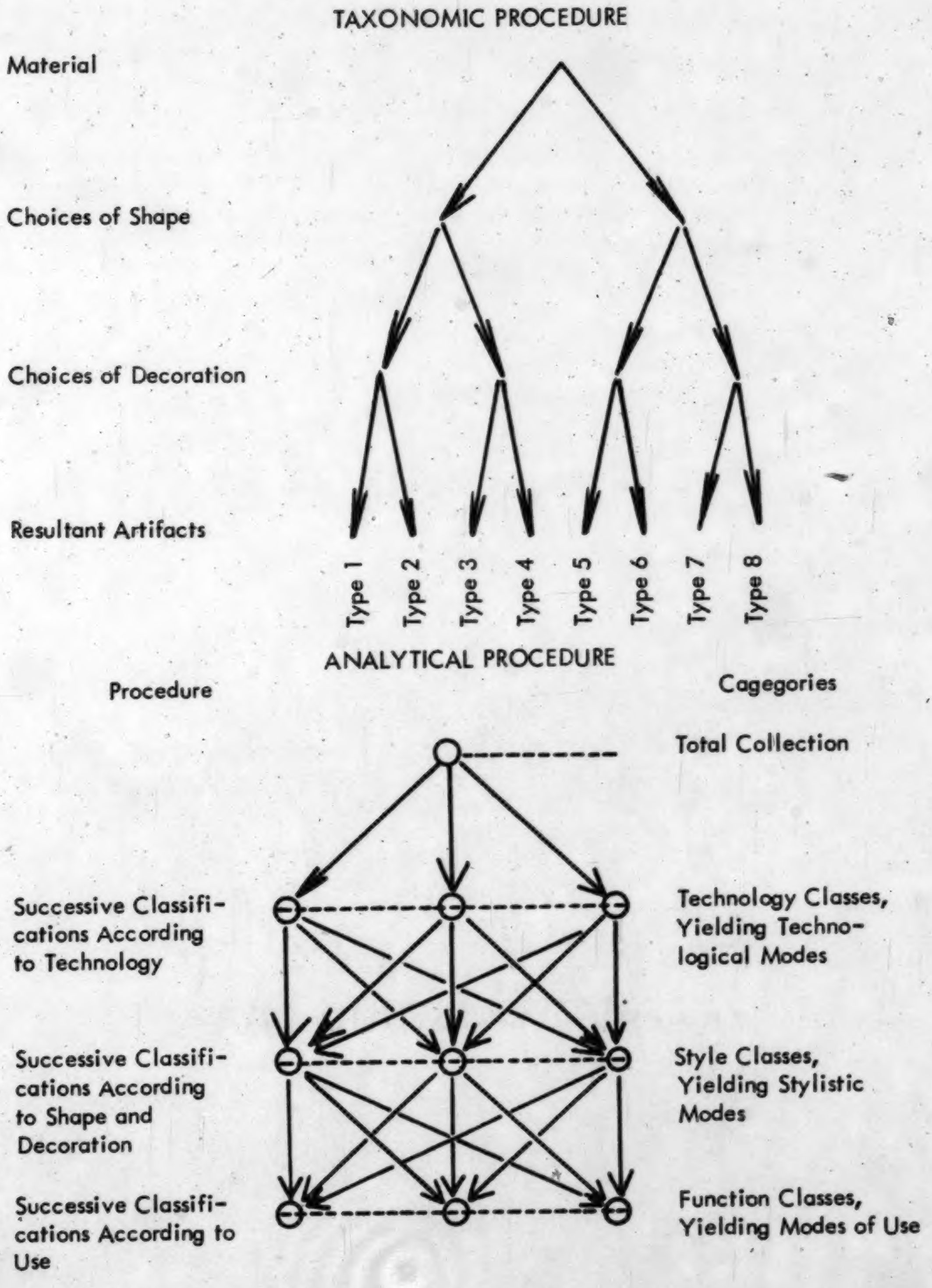

TAXONOMIC PROCEDURE
Material
Choices of Shape
Choices of Decoration
Resultant Artifacts
Type 1
Type 2
Type 3
Type 4
Type 5
Type 6
Type 7
Type 8
ANALYTICAL PROCEDURE
Procedure
Cagegories
Total Collection
Successive Classifications According to Technology
Technology Classes, Yielding Technological Modes
Successive Classifications According to Shape and Decoration
Style Classes, Yielding Stylistic Modes
Successive Classifications According to Use
Function Classes, Yielding Modes of Use

Figure 14. Classificatory Approaches According to Rouse (1960).

projectile typology devised by archaeologists was found to conform to the typological clustering of caches of projectiles in Mississippian mounds (Fowler 1969: 21-23).

The concept of mode has been utilized to analyze clusters of traits or features of artifacts within a type. Rouse (1972: 56) defines a mode as "the attributes of a class of features." A modal analysis may extract certain clusters of traits such as pottery handles or rim profiles and treat these features separately from the overall type. For example, Dawson (1974a) has completed a modal analysis of decorative motifs found on Blackduck pottery from sites in Ontario, Manitoba and Minnesota without handling the remaining tool inventory.

Krause (1972) has analyzed Arikara ceramics from the Leavenworth Site according to both the conceptual modes, which are the ideas and standards which influenced the artisans' decisions, and the procedural modes, which are the steps taken to fulfill the conceptual modes (see Appendix B). Krause's method reduces the arbitrariness of attribute choice and shifts the emphasis from primarily decorative motifs and surface finish, to a systematic selection of traits that reflect sequential decisions the potter must make to fulfill technological and cultural limitations and expectations.

A difficulty lies in the choice of attributes that are used to define the wares, types, varieties and modes. The choice is arbitrary and can include only a portion of the total possible attributes (Dunnell 1971: 131-145). The descriptions of the various categories become abstractions of clusters of objects represented by a number of traits.

The suitability of the choice of traits for any given classification can be determined only by evaluating the utility, parsimony, elegance and sufficiency of that classification (Dunnell 1971: 118). No single classification is adequate for all problems; in fact, the more classifications there are the more problems that can be approached (Dunnell 1971).

The Co-Influence Sphere Model requires several classificatory schemes. Specific assemblages and complexes must be defined according to a series of descriptive types; hopefully, refinement of various typologies will result in classifications that approach the folk taxonomy or mental template of the potters (Deetz 1968). This approach requires the analyst to have some understanding of the various decisions and concomitant behaviour that the potters made in producing pottery. Krause (1972) has made an excellent initial effort in this direction.

Basic Archaeological Units

Attempts to classify social units in the archaeological literature have resulted in a plethora of terms with a variety of meanings (Rouse 1972: 78-100). Within Manitoba, terms such as phase, focus, complex, and culture have been used without metholological definition, consistency of use, or theoretical implication (MacNeish 1958; Mayer-Oakes 1970; Hlady 1970b). It is therefore necessary to define the terms used here for Southwestern Manitoba and to clarify their conceptual levels and implications.

Research in Manitoba and in other political and cultural areas have been hindered not only by an inconsistency of terminology, but also by a tendency to construct definitions based upon artifacts from a few sites within a small region or sub-region. The evidence of mobility and vast distributions of historic groups makes such narrowly defined classifications unrealistic. In order to develop basic archaeological units that are useful for the Co-Influence Sphere Model, these units must be capable of incorporating data for prehistoric groups with similar mobility and distribution ranges.

The definitions of the terms are a series of classificatory units whose parts derive from their utility (Rouse 1972). The definitions of specific units, e.g., the Blackduck complex, are descriptive and analytical classifications of materials. These latter definitions are subject to change and are only as valid as they are useful, or as rigorous as the data upon which they are based.

The term assemblage refers to the surviving materials, features, and evidence of activities of a single residential group over a short period of time at one site. It is used in the same sense as the term component and represents the remains of a single occupation or multiple occupations that are so closely spaced that no differentiation can be made between the occupations.

The Co-Influence Sphere Model and the postulates of high mobility and utilization of multiple resource zones have implications for the definition of an assemblage. Any assemblage should be viewed as a possible set of specialized tools and remains for a particular adaptive strategy, as an expression of seasonal procurement, and/or as a blend of two or more groups. Analysis of the artifacts requires an emphasis upon the small sample of artifacts often identified as aberrant materials in order to test for evidence of trade, copying of foreign ideas, or evidence of social mixture, e.g., an archaeological expression of a winter camp with both Cree and Assiniboin peoples living together. The description and analysis of an assemblage requires an emphasis upon variability in addition to a normative description of a majority of artifacts.

The choice of attributes of any class of artifacts within an assemblage should include those attributes that are relevant for comparisons with different assemblages as well as similar assemblages. Identifications of ceramics from sites in the Middle Missouri have relied on rim profile, paste, and exterior rim decoration (Lehmer 1954; Wood 1967). Despite considerable variation in lip decoration, this set of attributes is rarely described and even more rarely adequately illustrated, with a few exceptions such as the ceramics from the Cross Ranch Site (Calabrese 1972). However, comparison of lip decoration may provide important insights into relationships between sedentary village and nomadic groups.

A complex is the total expression of a number of assemblages left by the same group over a sufficiently narrow time period that the cultural expressions undergo only minor changes. A complex has both cultural and historical validity. It represents the remains of a group with a shared lifestyle, the same overall tool kit, the same technological skills and preferences, and the same typological and technological attributes. It resembles, to varying degrees, the concepts of industry in Old World archaeology (Marks et al 1967), aspect in the Midwestern Taxonomic System (McKern 1939), and phase of the Willey and Phillips (1958) scheme.

There should be considerable overall homogeneity within a complex except in certain functional classes of artifacts that might reflect differential subsistence activities on a seasonal or geographical basis. Any single assemblage within a complex is unlikely to represent all of the traits used in defining a complex.

Unlike the geographical limits of locality or region defined for the phase concept (Willey and Phillips 1958: 22), the complexes identified for the Northeastern Plains incorporate vast areas across several biomes. The distribution includes assemblages within the core, secondary, and tertiary areas.

The interaction characteristic of the Co-Influence Sphere Model requires a shift from the normative approach of defining primarily pure and typical assemblages (Rouse 1972: 82-83) to one in which interaction and transitional examples are analyzed as a series of clinal variations. The archaeological expression of the historic Assiniboin of the Seventeenth Century could conceivably include sites of Assiniboin-Blackfoot, Assiniboin-Cree, Assiniboin-Gros Ventre, and Assiniboin-Mandan blends of remains. Sites within the core area may contain a higher frequency of pure Assiniboin remains with a shift toward equal frequencies between interacting ethnic groups in the secondary areas and minor frequencies of Assiniboin in tertiary areas such as a small trading party of Assiniboin occupying the village of another group. Pure Assiniboin assemblages would also be anticipated in tertiary areas, e.g., an encampment of the Assiniboin trading party prior to meeting the group with which it was trading.

The Co-Influence Sphere Model further raises the possibility of complicated mixtures due to:

a) contemporaneous assemblages by different groups,

b) assemblages left by groups who have historical relationships of varying degrees of antiquity, e.g., Assiniboin and Teton Dakota pottery or Cheyenne and Ojibwa pottery, or Cree and Blackfoot pottery,

c) assemblages representing mixture due to interaction such as marriage, taking captives, or trading,

d) assemblages representing part of a broad horizon reflecting interacting groups with sets of similar cultural values, or part of a gradual, evolving tradition, and

e) assemblages reflecting part of the record of groups who ranged over vast areas of land.

The possibility of the presence of ceramics left by groups with differing technological backgrounds (e.g., Plains village potters who select sources of high grade clays versus potters from more nomadic groups who rely upon whatever source is available) forces the analyst to consider such technological traits as paste, hardness and tempering in terms of functional decisions rather than vague, arbitrarily chosen traits.

A higher conceptual level of classification, the composite, is useful for subsuming a number of related complexes. This level would be comparable with the Midwestern Taxonomic System phase, with Stoltman's (1973: 1-3, 112-114) "culture", within which he combined several phases or groups of cultures into what appears to be a "supraculture", and with the concept of variant as used in the Central Plains and Middle Missouri research areas (Krause 1969; Wood 1969: 109-111; Lehmer 1971). The term culture has been used so frequently in a vague manner that it has been dropped as a formal unit within this conceptual scheme and is referred to only with respect to specific authors' use of the term. The use of phase is equally undesirable since it has been, and still is, used at two different conceptual levels in two different taxonomic systems.

A composite consists of a number of complexes which share a set of traits, both technological and stylistic, that may be conceived as being sufficiently similar to indicate a common and recent ancestry but sufficiently different that microevolutionary changes have taken place. The ethnohistoric and linguistic evidence indicates that movement and social fission have occurred among groups occupying the Plains and Boreal Forest, e.g., the Assiniboin from the Yanktonai and the Crow from the Hidatsa. As groups separated and became new identities, they developed dialectic differences and a variety of cultural differences, in part due to contact with new groups and in part due to changing lifeways and values. Under such circumstances, differences may emerge in hair styling, clothes, pottery and a variety of other traits, many of which should be identifiable archaeologically. As archaeologists compile growing bodies of data, refine their analytical techniques, and shift to intensive regional research projects, they will be in a position to define and analyze subtle differences in the archaeological record and to postulate the nature and degree of relationships between complexes.

A fourth conceptual level is the configuration. A configuration is a cluster of composites sharing sufficient traits that indicate either a distant generic ancestry or co-existence with a similar adaptive strategy that resulted in cultural convergence. A configuration is similar to the level of "phase" within the Midwestern Taxonomic System (McKern 1939) except that temporal relationships are important; to "tradition", (e.g., Middle Missouri tradition), used in the Middle Missouri Area Classification (Lehmer 1954); or tradition as used in the Willey and Phillips (1958: 34-38) scheme. Ethnohistorically, the development of the Blackfoot confederacy with the Blackfoot, Blood, Piegan, and Sarsi groups appears to represent both fission and parallel development among the Blackfoot, Blood, and Piegan and convergence on the part of the Sarsi.

The final, and most general, conceptual level is the pattern. This term is borrowed from the Midwestern Taxonomic System and is similar except that it is now placed in a temporal and evolutionary framework. A pattern is a cluster of configurations that share a series of traits reflecting a primary adjustment to a subsistence base, e.g., Middle Mississippian Pattern or Northern Plains Nomadic Hunting Base. Various patterns can reflect an ecotone orientation or subsistence activities associated with culture areas such as the Plains.

The pattern level of analysis maintains the dynamic orientation of change since the distribution of configurations across patterns through time result in testable hypotheses. The pattern and configuration levels are useful categories for comparative analysis of isolated assemblages. In areas such as the Northeastern Plains, where research is in the exploratory and pioneering stages, isolated assemblages or complexes have been reported in regions where there is inadequate research to combine them into composites, e.g., the Stutsman Complex (Wheeler 1963), the Snyder Dam assemblage (Syms 1974a), and the Snyder I assemblage (Syms 1974b). These assemblages and complexes may be incorporated at higher analytical levels.

The higher levels of analysis also become important for including data which have been assigned to vague categories of "cultures" and/or are of questionable validity for more detailed analysis. Much of MacNeish's (1958) data which come from sites excavated in arbitrary six-inch levels through continuous deposits of cultural debris must therefore be confined to these more generalized levels of analysis.

Some data can be analyzed most effectively by using the horizon style concept. An example of a horizon style is the Southern Cult symbolism that spread throughout

Mississippian complexes and into Northern Plains complexes (Howard 1953; Caldwell 1958: 68-70). The art motifs and specific decorated artifacts have not been assigned to specific complexes and appear to be a series of socio-religious symbols which permeated the value systems of many groups.

The development of a Co-Influence Sphere orientation requires a methodological shift by archaeologists from an individualistic, regional specific, isolationist approach to a co-operative, integrative approach. Since a particular complex cross-cuts several biomes and research regions, any definition of a complex or other conceptual classifications must involve standardization of terminology and traits among researchers in different regions.

While researchers who have utilized the chronological approach produced comparative results to the degree that they sought evidence of certain "index markers" such as ceramic types in other regions in order to establish general distribution ranges, the efforts have precluded standardization of typology for the "index markers", of other tool categories such as scrapers and projectile points, or of lithic sources (MacNeish 1954, 1958; Mayer-Oakes 1970; Hlady 1971b; Wright 1967a, 1972b). The research orientation has been individualistic with each researcher setting up his own typologies. The concepts of phase, local sequence, and regional sequence advocated by Willey and Phillips (1958: 22-27) and used by many archaeologists throughout North America include narrow geographical limits of the locality and region as part of their definitions. Willey and Phillips recommended that researchers in a region should come together harmoniously to produce consistency in the regional equences, but they also indicated that this has rarely been the case.

Since effective identification of various classificatory concepts such as the assemblage requires standardization of both the choices and definitions of relevant traits across several research regions, future research must involve cooperative efforts on behalf of the researchers in the various regions. The researchers will have to replace their individuality with integrative cooperation.

The archaeological record analyzed in the following chapter is confined to groups who made pottery. Pottery variation has been the primary variable used to define or identify various post-Archaic archaeological manifestations in much of North America. Other classes of tools have tended to be presented descriptively but are excluded from an effective comparative definition. Ceramic variation provides the most reliable set of traits upon which decisions are made for the levels of analyses and hypotheses that are generated.

These basic units provide a consistent framework for a variety of archaeological materials that have been applied to different conceptual schemes. The above framework has been developed as a tool to incorporate the postulates and data into interpretive hypotheses raised by the implications of the Co-Influence Sphere Model.

CHAPTER 5

EFFECTS OF EARLY AND MIDDLE WOODLAND DEVELOPMENTS ON SOUTHWESTERN MANITOBA

Introduction

The data on ceramics obtained from excavations, surface collections and private collections in Southwestern Manitoba provided a highly variable corpus of information. This variability can be accounted for by one or more of the three hypotheses discussed below:

A) The ceramic variability represents the range of expression of a single complex.

If this hypothesis is true, then all sites:

a) have a set of commonly associated ceramic and nonceramic traits;
b) fall within a single time period;
c) have a limited geographical distribution.

Previous investigators have attempted to assign all ceramics and mounds to a single protohistoric and historic Assiniboin archaeological manifestation called the Melita Focus and identified as a regional variant of the Manitoba and Blackduck Foci (MacNeish 1954, 1958; MacNeish and Capes 1958; Cameron 1962: 4; Capes 1963: 117-119). However, none of these premises have been substantiated. The archaeological data from Southwestern Manitoba was based upon the mound excavations and limited test pits excavated during the first quarter of the century (Nickerson 1913, 1914a, 1914b; Montgomery 1908; Capes 1963). The limited data from Nickerson's test excavations and surface samples were described under vague types such as Mandan pottery, Plains Ware, Winnipeg Fabric Impressed, and aberrant sherds, but they were never systematically defined according to types or assemblages (Capes 1963: 104-111). Materials from MacNeish's week-long research in 1953 were never analyzed but formed the primary basis for his "impressions". No radiocarbon dates nor any other dates were obtained. No systematic surveys were conducted to determine the distribution of various assemblages. Efforts to determine distributions of various ceramic types were hampered by limited comparative data and an absence of detailed local data.

B) The ceramic variability represents the evolution of stylistic change by a single group through time.

The second hypothesis can be true only if:

a) there are two or more complexes;
b) all assemblages of each complex share a set of commonly associated ceramic and nonceramic traits;
c) each complex has a narrow temporal period which does not overlap with preceding or subsequent complexes;
d) each complex is represented by assemblages representing transitional stages from the previous complex and to the subsequent complex.

The second hypothesis forms the basic, but often unstated, foundation for the development of unilineal, chronological models (Mulloy 1958; MacNeish 1958; Wright 1971; Byrne 1973). This unilineal model has been advocated for much of the Boreal Forest of Canada, including southeastern and northern Manitoba, in which Algonquian cultural history is interpreted as a unilineal sequence from Agate Basin through Shield Archaic, Middle Woodland Laurel and Late Woodland Blackduck and Selkirk to the historic period (Wright 1965, 1967a, 1967b, 1968a, 1971, 1972b). The only premise for which any evidence has been presented is the sequential time periods. However, the "evidence" consisted of rejecting any radiocarbon dates that did not fall within the predetermined time period, e.g., Wright (1967a) rejected three of the seven Laurel dates because they did not fit within the preconceived, narrow time range.

C) The ceramic variability represents the remains of numerous co-existing groups utilizing the region through time.

The third alternative is advocated because:

a) the resource potential is variable from biome to biome and from season to season within any biome; therefore, groups could make more effective uses of resources from two or more biomes (Postulate 1);
b) the ethnohistoric record indicates that all groups utilized two or more biomes and traded with groups from outside of their core area (Postulates 2, 3, 4);
c) the ethnohistorical record indicates that groups were highly mobile and utilized secondary and tertiary areas as a part of their resource exploitation or due to interaction through trade and/or warfare (Postulates 2, 9);
d) ethnohistorical groups shifted territories in response to:
    i) fluctuating resource potential due to such natural calamities as fire, climatic change, or changing faunal resources,
    ii) fissions and fusion of ethnic groups, and/or,
    iii) changing alliances.
e) biophysical and ethnohistoric data demonstrate that the historic movements and distributions can be understood most easily using the Co-Influence Sphere Model (Postulates 2, 3, 4, 5, 7).

In order to substantiate this hypothesis, the following premises must be demonstrated:

a) two or more complexes with different clusters of traits existed in the regions;
b) during one or more time periods, two or more complexes co-existed;
c) changes in complexes from time period to time period cannot be accounted for by a transitional shift from one assemblage to a later assemblage;
d) co-existing complexes during any single time period have different geographical ranges.

On the basis of the ethnohistoric and archaeological data, the ceramic variability is due to the following:

Hypothesis 1:

> The ceramic variability in Southwestern Manitoba represents the complexes of numerous co-existing groups during specific time periods as a result of evolutionary change in stylistic expressions and movements of populations.

This hypothesis is a combination of the two latter alternatives. In order to demonstrate the premises for this hypothesis, the new research data for Southwestern Manitoba are combined with recent data from nearby areas and previous data are re-assessed. Since historic groups occupying Southwestern Manitoba utilized other areas and were influenced by activities in other areas, then it is important to consider prehistoric developments beyond the research region as well.

In attempting to utilize comparative data of a variety of researchers from different periods, with different interests, working under a variety of adverse field conditions, and presenting the data within various conceptual orientations, it is frequently difficult to make quantitative or qualitative comparisons. For example, where foci (complexes) have been defined in contexts of presumed collapsed stratigraphy, a comparison of components is impossible and one must shift to a more general level such as horizon style. A critical evaluation of previous data is important.

In the present study comparative data are utilized from a large area of the continental interior in a number of broad research areas and subareas defined by Willey (1966). A modified form of these is used here to facilitate discussion (Figure 15); the boundaries have been altered to conform more closely with some of the vegetation zones. Discussion of geographical distributions of complexes is

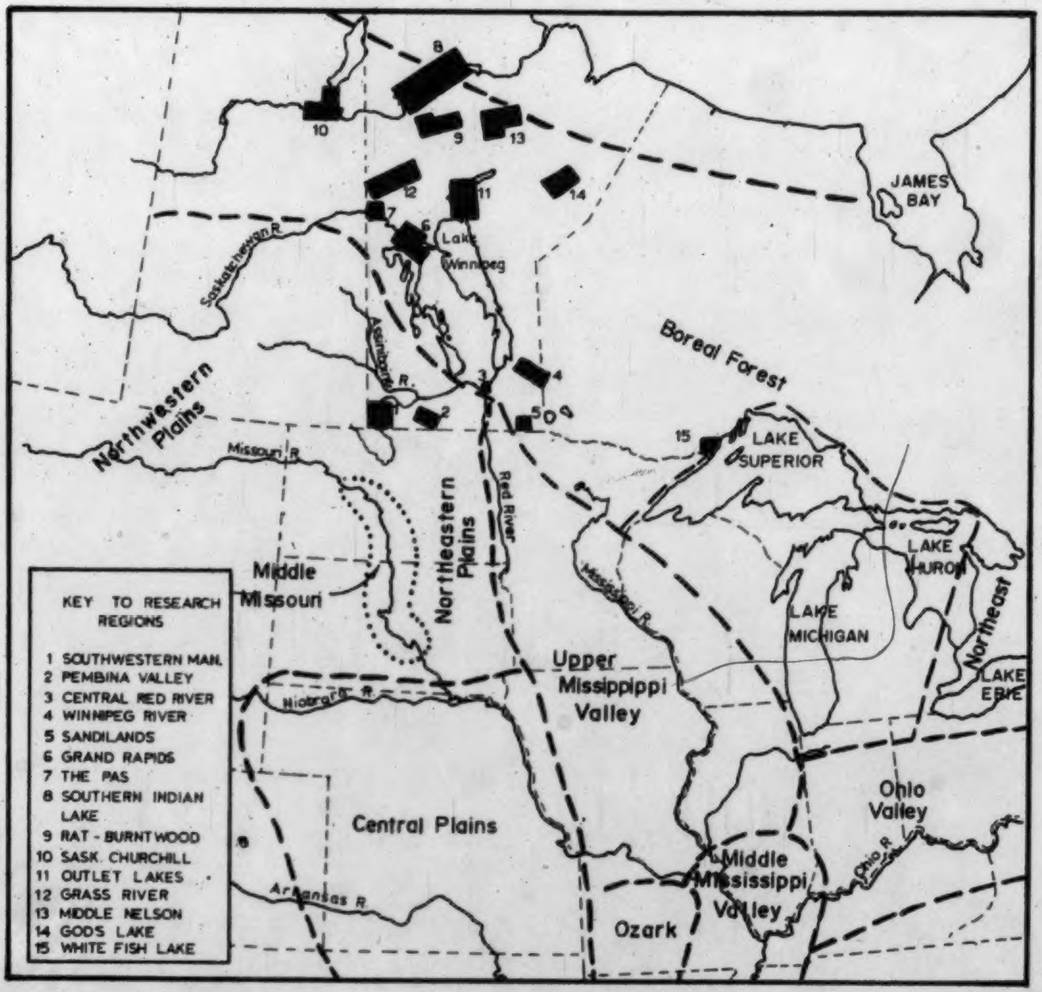

JAMES BAY
Saskatchewan R.
Lake Winnipeg
Assiniboine R.
Boreal Forest
Northwestern Plains
Missouri R.
Red River
Northeastern Plains
Middle Missouri
LAKE SUPERIOR
LAKE HURON
LAKE MICHIGAN
Mississippi R.
Northeast
LAKE ERIE
Upper Missisippi Valley
Niobrara R.
Ohio Valley
Central Plains
Ohio R.
Middle Mississippi Valley
Arkansas R.
Ozark
KEY TO RESEARCH REGIONS
1 SOUTHWESTERN MAN.
2 PEMBINA VALLEY
3 CENTRAL RED RIVER
4 WINNIPEG RIVER
5 SANDILANDS
6 GRAND RAPIDS
7 THE PAS
8 SOUTHERN INDIAN LAKE
9 RAT - BURNTWOOD
10 SASK. CHURCHILL
11 OUTLET LAKES
12 GRASS RIVER
13 MIDDLE NELSON
14 GODS LAKE
15 WHITE FISH LAKE

Figure 15. Research Subareas (modified from Willey 1966) and Main Research Regions in and near Manitoba.

hampered by the geographically discontinuous distribution of research regions; distributions of various complexes must be extrapolated between regions.

Ceramic complexes in Northeastern North America have been placed within three broad temporal categories:

a) Early Woodland Stage;
b) Middle Woodland Stage;
c) Late Woodland Stage (Willey and Phillips 1958; Griffin 1964; Jennings 1974).

An intrusive Mississippian Stage is also recognized. For the Northeastern Plains, ceramic sites have been placed within a Plains Woodland Stage which has a similar temporal span to the Middle Woodland, a Plains Village Stage which coincides with the Late Woodland Stage, and a variety of "floating" categories (Wedel 1961; Willey 1966: 317-328; Lehmer 1971). These broad temporal categories are maintained although their limitations are indicated and the data within the stages are revised to accommodate new data.

Early Woodland Stage

The concept "Early Woodland Stage" developed from research in the Eastern Woodlands of North America particularly the Midwest-Riverine area (Willey and Phillips 1958; Willey 1966; Montet-White 1968; Struever 1968; Griffin et al 1970; Fitting 1970; Struever and Vickery 1973; Jennings 1974; Stothers 1975). It has been characterized by "the introduction of pottery, mound building for burial of the dead, initial eastern agriculture, increasing use of special raw materials which become widely distributed such as copper, mica, galena, ocean shells and other items. . . with increased emphasis on burial ceremonialism" (Griffin et al 1970: 1).

Early Woodland technology is identified by:

a) thick pottery;
b) projectiles that are straight stemmed, expanding stemmed and/or corner-notched;
c) variety of end scrapers;
d) drills;
e) flint hoes;
f) plano-convex ungrooved celts;
g) bowls made from human crania;
h) spoons of turtle carapace;
i) ovate bifaces;
j) bone points, splinter awls, and antler tine flakers;
k) tubular pipes, some with blocked ends;
l) at Adena sites, reel-shaped gorgets and ornately incised tablets decorated primarily with a stylized, raptorial bird motif (Jennings 1974; Fitting 1970: 70-75; Willey 1966: 269-272).

The pottery, which is considered an important indicator, for the early part of the period of Early Woodland is generally thick (9.0-15.0 cm), straight-sided, conical, pointed or flat-bottomed, and covered with fabric impressions, often both inside and outside. Other external surface impressions include simple stamped surface finish and incised decorative designs, including a particular lozenge form (Jennings 1974). The pottery found in Michigan, Illinois, Minnesota and Iowa (the northwesterly limits of distribution) has been given a variety of names such as Marion Thick in Illinois and nearby areas and Schultz Thick in Michigan, and includes vessels that are straight-walled with either conical or flat bases. Vessels that are similar in technology and appearance include Leimbach Thick in north-central Ohio, Fayette Thick of Kentucky and southern Ohio, and Vinette I of New York (Fischer 1972: 147). These are simple, utilitarian vessels.

The pottery of the latter part of the Early Woodland is thinner with different paste and a variety of patterns of incised lines over a predominantly cord-marked surface-finish; it has been identified as Black Sand Incised in Illinois, Shiawassee

Ware in Michigan, and Dane Incised in southern Wisconsin (Montet-White 1968: 6; Anderson 1971; Fischer 1972: 151-152). The final stage of the Early Woodland, or Morton phase, is characterized by a variety of rim decorations which are believed to have evolved directly out of the Black Sand phase and which include incised, U-shaped lines and punctate impressions superimposed over a smoothed or cord-marked surface (Montet-White 1968: 6-7).

The distribution of Early Woodland is found primarily in the eastern Deciduous Forest and southern edge of the mixed Conifer-Hardwood Forest to the south of the Great Lakes with the Mississippi River forming the main western boundary (Figure 16). The area has been referred to as the Midwest-Riverine area, incorporating a web of major river valleys (Mississippi, Ohio, Missouri, Illinois, Wabash and their tributaries) lying immediately south of the Great Lakes (Struever and Vickery 1973: 1197). In Michigan, Early Woodland sites are confined to the southern portion of the state. Recent research has extended evidence of Early Woodland to the north. Salzer (1974: 47-48) has reported Black Sand sherds from lakes in northern Wisconsin. The only sites north of the Great Lakes however are the Boyd Burial on the north shore of Lake Erie (Stothers 1975: 118) and the Schoonertown Site (Conway 1975) and both of these sites are in the extreme southwestern portion of Ontario. The northwestern limit is represented by three Minnesota sites (La Moille Rockshelter, Graham Lake Mound I, and Schilling) with Marion Thick pottery which occurs in the west-central and southeastern parts of the state, particularly along the Mississippi River (Johnson 1969a; Birk 1973).

Various estimates have been made for the temporal span of the Early Woodland Stage. Griffin et al (1970) estimate 1000 B.C. to 200-100 B.C. A series of

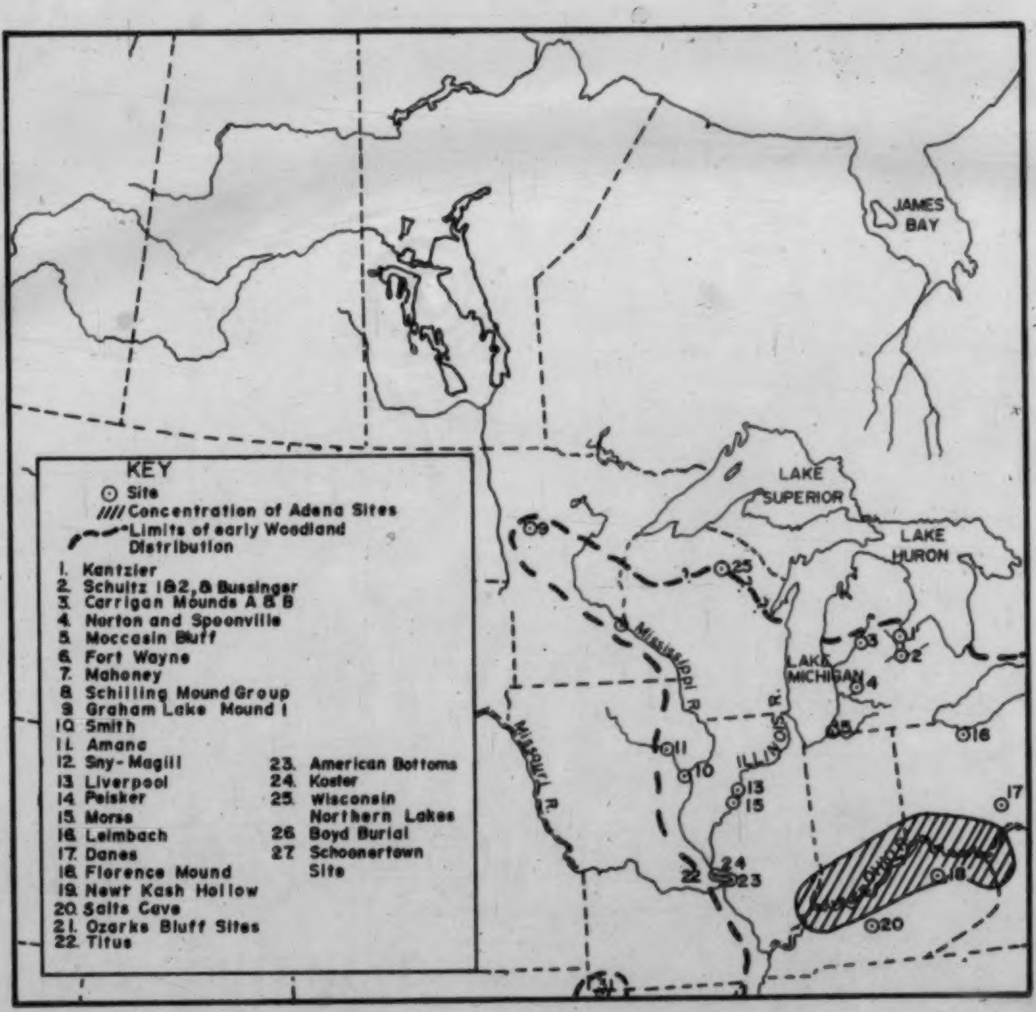

KEY
⊙ Site
//// Concentration of Adena Sites
Limits of early Woodland Distribution
1. Kantzier
2. Schultz 1&2, & Bussinger
3. Carrigan Mounds A & B
4. Norton and Spoonville
5. Moccasin Bluff
6. Fort Wayne
7. Mahoney
8. Schilling Mound Group
9. Graham Lake Mound I
10. Smith
11. Amana
12. Sny-Magill
13. Liverpool
14. Peisker
15. Morse
16. Leimbach
17. Danes
18. Florence Mound
19. Newt Kash Hollow
20. Salts Cave
21. Ozarks Bluff Sites
22. Titus
23. American Bottoms
24. Koster
25. Wisconsin Northern Lakes
26. Boyd Burial
27. Schoonertown Site
JAMES BAY
LAKE SUPERIOR
LAKE HURON
LAKE MICHIGAN
Mississippi R.
ILLINOIS R.
Missouri R.
9
25
3
1
2
4
5
16
11
10
13
15
17
24
22
23
18
20
21

Figure 16. Distribution of Early Woodland Materials.

radiocarbon dates from the Midwest-Riverine area (Table 3) provide evidence to conclude that:

a) Adena sites to the east are earliest with central dates circa 650-700 B.C. and a maximum range (at 1σ) of 1000 B.C.;
b) a majority of dates in the western and northern parts cluster initially about 550 B.C. with a maximum range of 700 B.C.;
c) a minimum radiocarbon date is A.D. 680±120 (M-1759).

The clustering of 50% of the dates in the Fifth Century B.C. provides tentative evidence that the spread of the Early Woodland traits was rapid and widespread.

Two subsistence orientations have been proposed for Early Woodland groups. In the mixed Conifer-Hardwood Forest biome of southern Michigan, the economic cycle was one of fairly large camps (such as the Schultz Site) during late fall and winter months based upon diversified hunting and acorn collection, followed by groups dividing into smaller camps during the spring to fish and hunt, and finally the re-emergence of large groups during the summer and fall based upon plant collecting and hunting (Fitting 1970: 90-95). This cycle is unlike any of the early historic developments postulated for the Upper Great Lakes by Fitting and Cleland (1969). The difference could be due, in part, to the location of the Early Woodland sites in an area that had a greater diversity of resources than the modern Canadian or Boreal Forest communities, but lacked the warmer temperatures of the modern climates for the development of horticulture.

Farther south, there is substantial evidence indicating that an eastern agricultural complex did emerge in the Midwest-Riverine area throughout the Woodland periods and possibly even as early as the late Archaic (Struever and Vickery 1973). The study of floral remains in coprolites as well as mound and habitation site debris assigned to Early Woodland componets indicate that the following were

TABLE 3

SELECTED SAMPLE OF EARLY WOODLAND SITES

Sites	Temporal Period	Nature of Sample	Comments	Reference
Minnesota				
La Moille Rockshelter	Marion	Excavated?		Johnson 1969
Schilling Mound Group	Marion	Tested village and remains		Birk 1973
Graham Lake Mound 1	Marion	Excavated		Wilford, Johnson & Vicinus 1969: 25, 26, 63, 64
Wisconsin				
Wisconsin Northern Lakes	Black Sand			Salzer 1974: 47-48
Iowa				
Smith	Marion-Morton			Montet-White 1968
Unnamed (Amana)	Marion-Morton			Montet-White 1968
Sny-Magill	520B.C. (M305,M306)			Montet-White 1968
Ontario				
Boyd Burial	Marion			Stothers 1975: 118
Michigan				
Schultz I	540B.C. (M-1524)	Stratified?		Fitting 1970: 90-94
Schultz II	530B.C. (M-1425) 530B.C.±120(M-1432)	Test; no pottery	Based on lithics&dates	Fitting 1970: 90-94
Kantzler		Totally mixed		Fitting 1970: 94-95
Carrigan Mound A	540B.C.±150(M-1984)	No pottery	Based on lithics&dates	Fitting 1970: 95
Carrigan Mound B	A.D.680±120(M-1759) 590B.C.±150(M-1849)	No pottery	Based on lithics&dates	Fitting 1970: 95
Moccasin Bluff		Surface		Fitting 1970: 90-94
Spoonville Village		Surface		Fitting 1970: 90-94
Norton Mounds		Surface		Fitting 1970
Fort Wayne Mound		Mound Fill		Fitting 1970
Bussinger		Surface		Fitting 1970
Mahoney		Surface		Fitting 1970
Illinois				
American Bottoms (5 sites)	2 Black Sands; 3 Marion			Munson 1971: 6; Harn 1971:24
Sheets	Marion			Fitting 1970:91
Larson	560B.C.±100(I-1652)			Fitting 1970:91
Liverpool	Black Sand			Montet-White 1968
Peisker Mound 2	325B.C. (M-1404)			Montet-White 1968: 11
Morse	330B.C.±200(M-745)			Montet-White 1968: 11
Koster	Black Sand			Montet-White 1968
Ohio				
Leimbach	510B.C.±260(OWU-250) A.D.15±240(OWU-259) 520B.C.±310(OWU-185)			Struever & Vickery 1973: 1199
Daines 2 Mound	280B.C.±140(M-2049)			Struever & Vickery 1973:1199
Florence Mound (base)	A.D.525±250(C-874)			Struever & Vickery 1973
Kentucky				
Newt Kash Hollow (Adena)	650B.C.±300 700B.C.±300			Struever & Vickery 1973:1206
Salts Cave				Struever & Vickery 1973

important:

a) tropical cultigens: Tropical Flint corn, squash, beans and gourd;
b) indigenous cultigens: sunflower and marsh elder;
c) possible indigenous cultigens: lamb's quarter or goosefoot, pigweed, knotweed or smartweed, maygrass or canary grass and giant ragweed.

Corn was rare at Early Woodland sites, squashes and gourds appeared earlier than corn at some sites, and the local plants were much more numerous in quantity and occurrence than were the tropical imports (Struever and Vickery 1973). Despite problems of interpreting distribution, primarily because evidence of most of these seeds can be obtained only by water flotation which has not been universally nor even widely used, the distribution of horticultural developments during the Early Woodland Stage is confined to the eastern portions of the Midwest-Riverine area.

Evidence on subsistence activities in the western and northwestern boundaries is limited, at present, by limited research. However, there are noteworthy insights being developed. For example, the Black Sand Complex (Phase) sites in the Lower Illinois valley are confined to crests of sand ridges that represent the margins of old stream channels within the floodplain of the Illinois River valley (Struever 1968: 292). Struever (1968: 292-293) hypothesizes that the habitation sites, consisting of continuous linear debris scatter of light density ranging from 0.5 to 2.0 acres, represent shifting settlement and multiple reoccupation of a single microenvironment--the river levees. Furthermore, survey data and excavations of the Peisker Site indicate an absence of structures or storage pits, the utilization of only local lithic materials, the absence of ornate items such as engraved tablets that characterize Adena sites, simple unprepared burial pits with nothing except red ocher accompanying the burials, a tool kit of projectile points and knives considered as a typical hunting-butchering kit, and numerous pebble manos and hammerstones. Food remains consisted of a wide variety of land animals represented by few examples, with the exception of white-tail deer which were numerous, and nuts as the only plant food preserved. The variety of animal remains and absence of storage facilities and permanent structures, absence of plant domestication or intensive plant collecting indicate small groups following a shifting, impermanent subsistence cycle involving the use of diverse resources (Struever 1968: 302-303).

Available evidence on subsistence activities suggests that the sites represent activities of small, nomadic groups. There is evidence of group interaction in the distribution of special raw materials such as copper and ocean shells and in the widespread distribution of uniform ceramic technology, particularly the early Marion Thick ceramics. During the latter period, the ceramics appear as regional variants. The process of initial widespread homogeneity followed by regional diversification parallels the earlier shift from Paleo-Indian to early Archaic times in the eastern United States (Caldwell 1958). For the eastern United States, this change has been attributed to pioneer movements followed by filling of environmental niches and the development of localized cultures due to the adaptive advantages of the multiple resource utilization of Archaic primary forest efficiency (Caldwell 1958; Fitting 1976). However, to make the assumption that localization of archaeological materials is evidence that a particular adaptive pattern has reached its ecological limits in terms of carrying capacity (Fitting 1976: 32) is dangerous, particularly when it is unsubstantiated by any models of resource utilization.

No evidence of Early Woodland sites has been discovered in Southwestern

Manitoba nor any other region in Manitoba. This absence may be due to the inability of researchers to recognize Early Woodland ceramics or to the absence of groups with an Early Woodland tool inventory. The latter reason is proposed because:

a) evidence of Early Woodland Marion materials is sparsely represented in Minnesota, the closest zone of distribution;
b) this sparse sample represents marginal utilization as a secondary or tertiary area for groups whose core area included major riverine valleys such as the Illinois;
c) none of the Early Woodland sites reflect a dependence on bison, the major Plains resource; resources are diffuse with Woodland game such as deer being most important.

Despite the lack of evidence of Early Woodland assemblages in Southwestern Manitoba, the new technological and economic traits of this stage set the basis for later developments that do take place in Southwestern Manitoba. The emergence of mud flat horticulture in the Midwest Riverine area provided the foundation for subsequent more intensive horticultural practices of the Middle Woodland Period. The process of regionalization in ceramics coupled with the evidence of shifting to plant foods may reflect adaptive strategies due to demographic pressures on the environmental carrying capacity (Cohen 1975). The shift to plant resources may have represented a shift to less preferred or prestigious foods requiring increased labour costs (Cohen 1975: 472-474). The shift to labour intensive resources which were available seasonally had the potential of reducing group mobility and interchange of individuals between groups.

The development of horticulture and the increased productivity it provided resulted in a pronounced population increase as indicated by increased density of sites, increased density of materials in sites, and increased numbers of complexes representing probable factionalism and greater numbers of new ethnic groups. In other parts of the Western Hemisphere, the shift from primarily hunting-gathering to the intensive use of plant resources has resulted in marked population increase (MacNeish 1964; Patterson 1973). Relating population growth solely to a shift to plant domestication is simplistic; the complexity of the number of interrelated demographic variables that must be considered can be appreciated by perusing recent articles on demographic change associated with the appearance of horticulture in the Eastern Hemisphere (Polgar 1972; Sussman 1972; Hassan 1973; Sengel 1973). For the present discussion, however, there is greater concern for recognizing that subsistence changes elsewhere on the continent had important implications for the subsequent utilization of Southwestern Manitoba than there is for determining whether demographic growth was the result of reduced mobility, increased fertility, changes in child spacing, birth control, diet, age/sex ratios or other factors.

Changing demographic patterns probably led to increased regionalism in technology by the latter part of the Early Woodland Period. Although it can not be proved at present, population growth and the development of greater numbers of distinct ethnic groups may have created a degree of crowding and conflict that necessitated subsequent territorial expansion and adaptation to new economic cycles in the Boreal Forest to the north and Plains to the west during the subsequent Middle Woodland Stage.

Middle Woodland Stage

Mason (1970) has reviewed at length the various uses made of the term

"Middle Woodland". Included are:

- a) a typological usage relying upon formal similarities;
- b) historical cultural development;
- c) a delimited time interval;
- d) an ontogenetical stage in a cultural tradition.

As Mason indicates, archaeologists rarely define their various usages of the term, but commonly mean:

> . . . (1) contemporaneity with Hopewell, the archetype of Middle Woodland, and (2) sharing (to an unspecified degree) of some stylistic concepts (mainly in pottery) and perhaps of other attributes of artifact inventories (conjoined copper tubes, platform pipes, obsidian). Other than on a regional basis, or as a generalization excluding as many cases as it comprehends, Middle Woodland is not and cannot be defined as presently used in terms of habitat, subsistence patterns, economics, mortuary practices, or social organization. (Mason 1970: 811).

The concept of Middle Woodland, as used here, incorporates Hopewellian materials plus Woodland archaeological manifestations that are approximately contemporaneous in adjacent areas to the north and west and which demonstrate influences by means of the presence of certain horizon styles or modes. The nature of these influences will be discussed shortly. It cannot be as tightly delimited, as Griffin would like, nor can it be considered as part of a tradition, since it reflects very pronounced differences between the preceding Archaic and Early Woodland and the succeeding Late Woodland. The term stage as used here with Middle Woodland does not necessarily connote any major technological or subsistence shift although this was certainly the case in some areas. The development of different complexes, horizons or traditions in and near Southwestern Manitoba reflect the widespread impact of Hopewellian developments. The cultural history of Southwestern Manitoba can be appreciated only through an understanding of the processes taking place in the Hopewellian centres.

Temporal estimates for Middle Woodland include:

a) 200 B.C. to A.D. 400 (Griffin 1967: 183);
b) 200 or 100 B.C. to A.D. 300 (Griffin et al 1970: 1);
c) 200 B.C. to A.D. 500 (Fitting 1970: 97);
d) 300 B.C. to A.D. 700 (Sanders and Marino 1970: 96).

The latter range is most consistent with the available dates although some Middle Woodland groups persisted even later in peripheral zones of the Boreal Forest.

Hopewellian Developments

Hopewellian sites were clustered along segments of the major water routes from Florida to Minnesota (Griffin 1967: Figure 3). There were two major centres of Hopewellian developments in Illinois and Ohio (Jennings 1974: 228-242; Struever and Houart 1972) which are relevant to understanding the Middle Woodland developments on the Northeastern Plains and adjacent Boreal Forest. The two centres underwent different developments; the Illinois Hopewell manifestations overlapped temporally with Adena developments and began somewhat earlier than the Ohio developments (Griffin 1967: 183). Both Illinois and Ohio Hopewell had expansionist tendencies; Illinois influences extended into the eastern Plains, eastern Canada, Minnesota, Iowa, Michigan and Wisconsin, and Ohio influences have been found in Pennsylvania, New York, and are ubiquitous to the south (Jennings 1974: 229-230).

Hopewellian ceremonial sites are characterized by:

a) large burial mounds with deep central tombs and geometric earthworks requiring corvée labour;
b) abundant artifacts made of non-local materials such as obsidian, copper, and mica;
c) production of status items by specialized craftsmen;
d) the removal of large quantities of status items and non-local raw materials from the economic sphere through deposition with burials of an elite;

e) differential burial treatment of an elite as expressed in accompanying mortuary items and methods of disposal;
f) increased reliance upon horticulture;
g) a standardization of certain socio-technic artifacts such as ear spools, obsidian artifacts, plain and effigy platform pipes, mica and copper cut-outs, human figurines, marine shell containers, and incised tablets (Jennings 1974: 230-238; Struever and Houart 1972: 48; Griffin 1967: 184).

The Hopewellian centres have been defined as clusters of sites in which ideas and materials were being exchanged in an interaction sphere (Struever 1964; Struever and Houart 1972). Struever and Houart (1972: 49-51) believe that most diagnostic Hopewell artifacts are status-specific items which served in a variety of ritual and social contexts since they are found in both village debris and burial contexts. On the other hand, the artifacts associated with subsistence activities, including utilitarian ceramic vessels, show marked regionalization. The concept of the Hopewellian Interaction Sphere was coined to describe a situation in which a number of autonomous centres shared a set of social status items and exotic raw materials.

Furthermore, the variable frequencies of raw materials and the stylistic variability of sociotechnic items among centres indicate that a number of large Hopewell sites may have served as regional transaction centres which were distinct from other Hopewellian sites in terms of size, complexity of earth constructions, and quantity and diversity of social status items (Struever and Houart 1972). Seven, and possibly twelve, such centres (Figure 17) have been identified, each characterized by its own unique concentrations of exotic materials, stylistic variation, and local raw materials (Struever and Houart 1972: 52-55). When the total sample of Hopewellian exotic materials is considered, it is evident that copper, mica, obsidian, marine shells, pipestone, crystal quartz, chlorite, meteoric iron, various siliceous raw materials such as Knife River flint (brown chalcedony), grizzly bear teeth, fresh water pearls, galena, silver, micaceous hematite (ochre), plus other materials, were imported via a vast maze of networks spanning most of the continent (Figure 18). However, when sites are considered separately, some are found to have been centres for concentration of raw materials and subsequent production of finished tools of those materials. The mechanisms by which raw materials such as obsidian from Yellowstone National Park, or Knife River flint from western North Dakota, reached centres such as the Hopewell Site in Ohio could conceivably involve long trips by Hopewellian peoples or the movement of goods across several societies by means of trade networks. If such networks were operating, evidence for the movement of goods and exotic raw materials should be found in the Middle Woodland archaeological complexes that provided them. Furthermore, it should be possible to infer the direction of movement of goods from the distribution within Hopewellian sites. The greater quantities of obsidian and grizzly bear teeth in the Ohio centres than in the Illinois sites, implies a direct contact between the Ohio centres and the foothills of the Rocky Mountains which by-passed the Illinois centres (Struever and Houart 1972).

The emergence of major Hopewellian centres in the Illinois valley and the expansion of Illinois centres into other areas, such as the Trempealeau Site in west central Wisconsin and Kansas City Hopewell Sites in Kansas, raises the problem of how these populations were supported and whether changing subsistence-settlement activities reflect adaptation to environmental change, development of subsistence adaptations, or some combination of both.

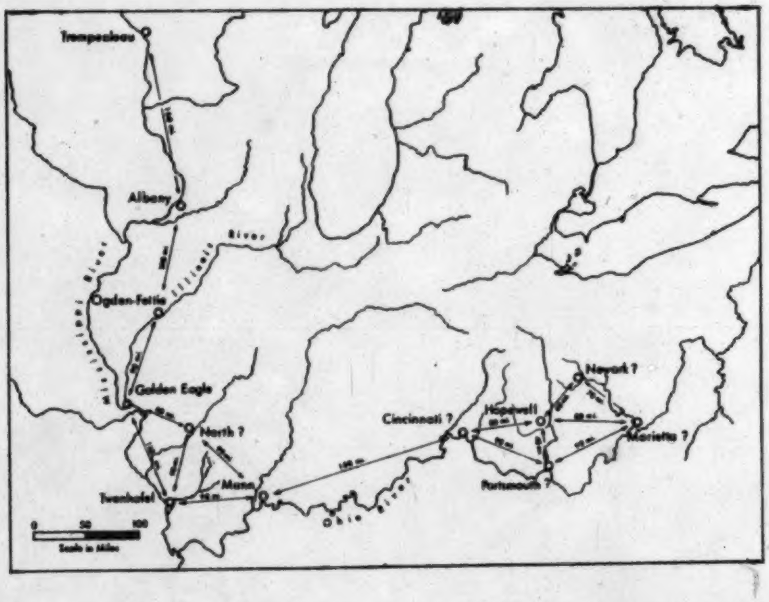

Trempealeau
Albany
Illinois River
Mississippi River
Ogden-Fettie
Golden Eagle
North ?
Twenhafel
Mann
Ohio River
Cincinnati ?
Hopewell
Newark ?
Marietta ?
Portsmouth ?
0 50 100
Scale in Miles

Figure 17. Regional Transaction Centres of the Middle Woodland Stage in the Midwest-Riverine System (Struever and Houart 1972: 53).

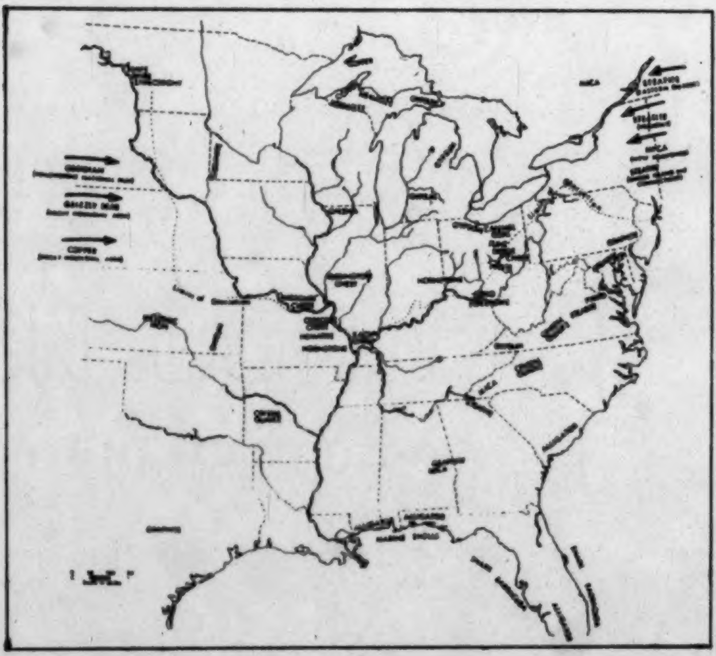


Figure 18. Potential Resource Areas for the Raw Materials Distributed Through the Hopewellian Interaction Sphere (Struever and Houart 1972: 67).

Recent research in the lower Illinois valley has emphasized the importance of mud flat agriculture as a subsistence base for Hopewellian developments (Struever 1968; Struever and Houart 1972; Struever and Vickery 1973). In this region, there were large ceremonial centres located on bluffs overlooking the valley, major habitation sites on talus slopes at the base of the valley, and habitation sites along river shorelines. The habitation sites were sedentary settlements. They contained large amounts of debris, high frequencies of storage pits, and houses with heavy supporting frameworks. The concentrated population in this region was supported by intensive harvest collecting of selected, high yielding natural foods such as: "(1) nuts and acorns; (2) the seeds of commensal plants such as Iva (marsh-elder), Polygonum (smart-weed), and Chenopodium (lamb's-quarters); (3) whitetail deer; (4) migratory waterfowl; and (5) certain species of fish" (Struever 1968: 305). The native plants are pioneer annuals that are noted for their hardiness, high potential productivity, and adaptability to disturbed conditions (Struever and Vickery 1973: 1197-1199). In the valley bottoms where spring floods constantly disturb soil and deposit silts in temporary catch basins there were ideal conditions for the growth of the native plants. In addition to the native cultigens, corn, beans, and squash were being grown at Hopewellian sites although these tropical cultigens were less important than native plants in the Illinois valley (Struever and Vickery 1973).

The Hopewellian settlements represented sedentary clusters of peoples with a chiefdom level of social organization (Sanders and Marino 1970: 96-98). The organizational controls required to build the mounds and large earth works, the control of extensive trade networks, and the special status of an elite group expressed in preferential burial accompanied by vast quantities of non-local raw materials and elaborate status items, support the idea of an elaborate social organization beyond the tribal level. Population estimates are difficult to determine but ethnographic samples indicate that chiefdoms were likely to average in excess of 2,000 people and range as high as 100,000 (Sanders and Price 1968: 81-83). The various centres represented a series of chiefdoms scattered along the main river systems south of the Great Lakes.

Whether the increased intensity of resource utilization and demographic growth is the result of continuous evolving adaptation or a response to changes in the biophysical or social environments cannot be determined. The developments did take place within the Sub-Atlantic Climatic Episode which was initiated by a shift to cloudier wetter summers in the Northern Plains and Boreal Forest, and the development of upland muskeg in the Boreal Forest (Bryson and Wendland 1967: 293-294). The increase in moisture postulated for the Sub-Atlantic would have caused increased flooding and disturbance in the valley bottoms and may have increased the productivity of the native cultigens. Any effort to propose a climatic cause for intensification of resource utilization and demographic growth is undoubtedly overly simplistic.

The Middle Woodland Stage can not be viewed as a static cluster of technological traits. The increase in populations based on incipient horticulture of the preceding stage and intensification during the present stage, the emergence of population clusters into chiefdoms with the concomitant centralization of control, and the organization of vast trade networks for the redistribution of non-local resources must be considered as important processes of change for groups in surrounding areas. In the following sections, it is proposed that the developments of the Northern Tier Middle Woodland, around and to the north of the Great Lakes, and the Early Ceramic Plains Village Configuration reflect population movements and shifts to multiple biome utilization in response, at least in part, to the changes in the Hopewell area.

Northern Tier Middle Woodland

The Laurel Composite is the diagnostic Middle Woodland expression of the Boreal Forest west and north of the Upper Great Lakes (Figure 19). It has been combined with other Middle Woodland expressions such as Point Peninsula II, Saugeen, and North Bay under terms such as Lake Forest Middle Woodland or Northern Tier Middle Woodland (Mason 1966, 1969; Fitting 1970; Jansen 1968; McPherron 1967a; Brose 1970). The latter terms represent broad, adaptive configurations that include a number of composites located primarily around the Great Lakes and the Boreal Forest to the north and west of the Great Lakes. A number of regional and temporal complexes have been defined for the Laurel Composite (Stoltman 1973, 1974).

The term Laurel Composite is used here because all these archaeological units share a common core of traits: such as toggle head harpoons, overlapping projective point typologies and conical ceramic vessels with varying frequencies of pseudoscallop shell stamping, linear stamping and stab-and-drag stamping decorative techniques applied to the upper one-third of the vessel. However, a number of complexes have been defined on the basis of temporal and geographical variations in ceramics (Stoltman 1973). Other traits which are not ubiquitous but are identified as part of the Laurel Composite are small burial mounds, often containing

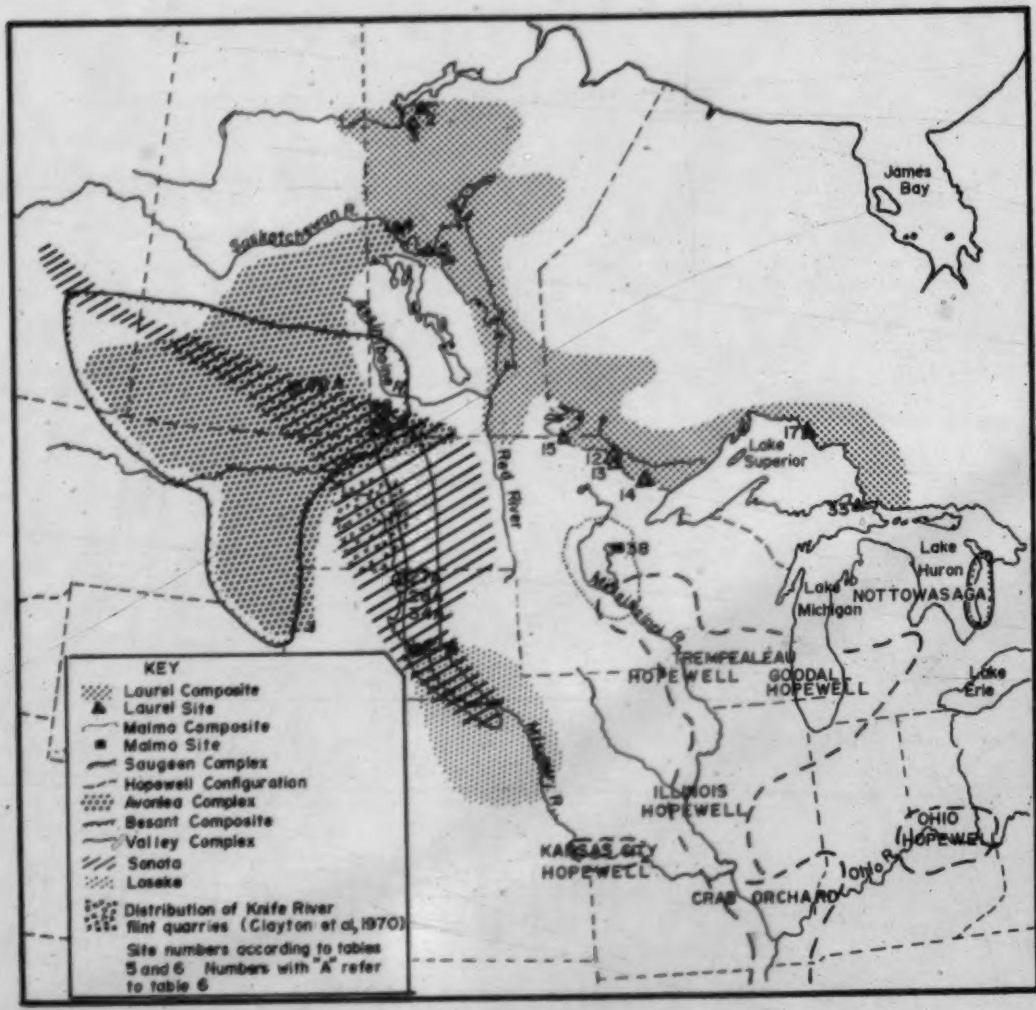

James Bay
Saskatchewan R.
Red River
Missouri R.
Mississippi R.
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Ohio R.
15
12
13
14
17
33
38
TREMPEALEAU HOPEWELL
GOODALL HOPEWELL
NOTTOWASAGA
ILLINOIS HOPEWELL
KANSAS CITY HOPEWELL
OHIO HOPEWELL
CRAB ORCHARD
KEY
Laurel Composite
Laurel Site
Malmo Composite
Malmo Site
Saugeen Complex
Hopewell Configuration
Avonlea Complex
Besant Composite
Valley Complex
Sonota
Loseke
Distribution of Knife River flint quarries (Clayton et al, 1970)
Site numbers according to tables 5 and 6 Numbers with "A" refer to table 6

Figure 19. Distribution of Middle Woodland Sites and Archaeological Units for the Upper Great Lakes, Mid-West, Central Plains and Northern Plains. Site Numbers refer to Table 5 and 6.

bundle burials, a variety of stemmed and notched projectile points, the cold hammering of native copper into simple tools such as awls, barbs, chisels and beads, and hafted beaver incisor tools (Wright 1967a; Stoltman 1973: 113). Burial mounds are localized in the southern portions of the Boreal Forest along the boundary between Manitoba and Minnesota, and copper is more common in the eastern sites around the Great Lakes.

Exotic items are rare. Some obsidian has been found, as has the occasional monitor pipe (Kenyon 1970). In contrast to the Hopewellian sites, the evidence from Northern Tier Middle Woodland sites indicates a lack of permanent settlements, an absence of large ceremonial mounds or structures, little evidence of social stratification, and no evidence of intensive resource utilization based upon native or tropical plants.

The presence of obsidian and the occasional Hopewellian status item demonstrate contact with Hopewellian sites. The tool inventory, particularly the pottery, indicates that the Northern Tier Middle Woodland is more than a mere extension of Hopewellian technology. The pottery, particularly Laurel pottery, is distinctly different from the Havana Hopewellian pottery to the south. While there is a vague similarity between the shape of the conical Laurel vessels and the conoidal Havana vessels, the smooth, coil-made Laurel pottery, with its variety of decorative motifs including its pseudoscallop shell design, manifests its own unique cluster of technological and decorative traits. Laurel pottery cannot be considered as merely a northern extension of Hopewellian traits.

The non-ceramics cannot be adequately compared. Materials from Manitoba come from sites with collapsed stratigraphy and are useless for comparative purposes

(Stoltman 1973); the only reported site in Manitoba that appears to contain a pure, unmixed component is the Notigi Site (Wiersum and Tisdale 1974) for which there is no final report.

The temporal span for Laurel has been inadequately documented. MacNeish (1958: 55) suggested 500 B.C. to A.D. 1000, Mayer-Oakes (1970: 378) estimated 500 B.C. to A.D. 700, and Wright (1972: 59) suggested a time span of 700 B.C. to A.D. 1000. However, a sample of 25 dates (Table 4) indicates that the basal dates are too early and that there is a trend for late dates to persist in the north. Only two dates fall in the B.C. range, and the earliest of those is a Gakushuin date which has been found to be unreliable (Wright 1968; Bryan 1975: personal communication). A reasonable initial date is 100 B.C. The dates continue to A.D. 1030±150 (S-744) without any evidence of clustering throughout the time continuum. The dates of A.D. 1030±150 (S-744) and A.D. 957±100 (I-2594) indicate that Laurel may not have terminated until A.D. 1100.

By A.D. 100, the Laurel Composite had spread from northern Minnesota and Michigan to western Ontario and northern Manitoba. None of the Michigan and Minnesota dates are later than A.D. 600 whereas the Hungry Hall and Notigi Lake dates are several hundred years later. On the basis of the present sample of dates, the spread of the Laurel Composite appears to have been extremely rapid.

Laurel sites are confined primarily to the southern Boreal Forest of western Ontario, extreme northern parts of Michigan and Minnesota, and eastern and northern Manitoba (Figure 19). In Manitoba, sites are common along the Winnipeg River (Hlady 1970b: 278; Penny 1970; MacNeish 1958), the central Red River (MacNeish 1958; Hlady 1970b), the lower portions of the rivers that flow into

TABLE 4

SELECTED MIDDLE WOODLAND SITES

	References	C-14 Dates	Comments
A) LAUREL			
Saskatchewan			
1. Churchill River Sites (6)	Meyer & Smailes 1974	-	All small test samples or surface materials
Manitoba			
2. Notigi Lake Site (UNR-23)	Weirsum & Tisdale 1974	A.D.750±130(S-746) A.D.1030±150(S-744)	Some mixture
3. Wapisu Lake (UNR-26)	Dickson 1975[b]	A.D.305±195(S-959) Modern (S-958)[a] A.D.30±85(S-956)	
4. The Pas Site	Tamplin 1973	A.D.240± ?	Stratified
5. Tailrace Bay Site	Mayer-Oakes 1970	-	Mixed stratigraphy
6. Cemetery Point Site	MacNeish 1958	-	Mixed stratigraphy
7. Anderson Site	MacNeish 1958	-	Mixed stratigraphy
8. Lockport Site	MacNeish 1958	-	Mixed stratigraphy
9. Falcon Lake Site	Trottier 1973	-	
10. Avery, Montroy and Paddock Sites	Vickers 1949,1950; Joyes 1969	-	Mixed stratigraphy
11. Whitemouth Falls	Hlady 1970	-	
Minnesota			
12. Smith Mound	Stoltman 1973	-	
13. McKinstry Mound	Streiff 1972; Stoltman 1973	30B.C.±45(WIS-486) A.D.10±60(WIS-487) A.D.250±55(WIS-471) A.D.110±55(WIS-489) A.D.560±55(WIS-490)	Mixed Laurel and Blackduck
14. Pearson & Pike Bay	Streiff 1972; Stoltman 1973	-	
Ontario			
15. Armstrong Mound & Long Sault Site	Kenyon 1970	A.D.957±100(I-2594)	Believed to be Laurel because mound fill materials were Laurel
16. Sand River Site	Wright 1967	A.D.320±100(M-1507)	
17. Heron Bay Site	Wright 1967	A.D.140±150(GSC-686)[b] A.D.410±160(GSC-445)[b] A.D.610±170(GSC-208)[b] A.D.700±60(S-171) A.D.790±130(GSC-449)[b]	
18. Pelican Falls Site	Wright 1967	-	Mixed; tested
19. Killala Lake Site	Wright 1967	-	Unmixed
20. Paye Plat Site	Wright 1967	-	Pure; tested
21. Little Pic Site	Wright 1967	-	
22. Michipicoten Harbour Site	Wright 1967	-	Surface Surface collection
23. McLaren Site	Wright 1967	-	Surface collection
24. MacKenzie Site	Wright 1967	-	Surface; mixed
25. Rossport Site	Wright 1967	-	Mixed; tested
26. Eaka Site	Wright 1967	-	Surface
27. Lac Seul Site	Wright 1967	-	Surface
28. Pickerel Lake Site	Wright 1967	-	Surface
29. Hungry Hall Site	Wright 1967	-	
30. Swan Lake Site	Wright 1967	-	
31. MacGillivary Site	Wright n.d.	290B.C.±80(Gak-1278) A.D.20±200(Gak-1492)	Midden over mound
Michigan			
32. Summer Island Site	Brose 1970	A.D.250±100(M-1985) A.D.70±280(M-2073) A.D.160±130(M-2074) A.D.430±400(M-2055)	Same feature
33. Naomikong Point Site	Jansen 1968		
34. Juntunen Site	McPherron 1967	-	
35. Arrowhead Drive Site	Bettarel and Harrison 1962	A.D.50±120(M-1392)	
B) POINT PENINSULA 2			
36. Serpent Mounds Site	Johnson 1968	A.D.128±200(M-850)	
37. Killarney Site	Wright 1967	80B.C.±200(M-428)	
C) MALMO			
38. Anderson	Johnson 1964	200B.C.±180(I-786)	
39. Morrison Mound 13	Johnson 1964	690B.C.±200(I-787)	
40. High Island	Johnson 1964	A.D.450±150(I-788)	

a) considered unacceptable

b) Wright (1967: 8, 95) considered these dates to be unacceptable

Lake Winnipegosis (Mayer-Oakes 1970; Hlady 1970b; Tamplin 1973) and the Rat-Burntwood River System (Wiersum and Tisdale 1974). The latter has numerous sites but evidence of Laurel to the north, on the Southern Indian Lake, is limited to a few sherds in a sample numbering in the tens of thousands; the northern boundary is clearly on the Rat-Burntwood System. Occasional sherds have been found in northeastern Manitoba but they are rare. Seven Laurel sites were found during the survey of the Churchill River in Saskatchewan (Meyer and Smailes 1974; Meyer 1975). The distribution of Laurel sites in Manitoba is confined primarily to the southern Boreal Forest.

A few sites have been reported in the Aspen Parkland along the edge of the Boreal Forest. The Avery, Montroy, and Paddock sites along the Pembina valley of southcentral Manitoba contained Laurel sherds (Vickers 1945, 1948a, 1949, 1950; Joyes 1969, 1970). The Lockport Site near the junction of the Red and Assiniboine Rivers lies within the Aspen Parkland (MacNeish 1958: 13-20). The Pas Site is situated in a localized area of the Aspen Parkland. In contrast to the Boreal Forest, sites in the Aspen Parkland are sparse.

No Laurel sites have been found on the Plains. Occasional sherds appear in large collections and three sherds have been found at the Riverview II Site in Southwestern Manitoba.

Data on subsistence activities are limited by poor bone preservation at most sites in western Ontario and Manitoba (Wright 1967: 41, 97; Wiersum and Tisdale 1974). The faunal remains from the Heron Bay Site along the north shore of Lake Superior (Wright 1967), the village debris in the mound fill of the Pike Bay, Smith 4, and McKinistry Mound I in northern Minnesota (Lukens 1973), and the features of UNR-23 on Notigi Lake in northern Manitoba (Wiersum and Tisdale 1974: 61-67) all reflect similar dietary preferences. Beaver and moose were the most important animals at Heron Bay and the Minnesota sites, while beaver, large mammals, and medium mammals were most important at Notigi Lake. Caribou and muskrat were represented by fewer bones. Sturgeon, northern pike and sucker were found in small quantities at both the Heron Bay and Minnesota sites, and Heron Bay also included round whitefish and walleye or sauger. Birds were absent from Heron Bay, unimportant in the Minnesota sites, but important at Notigi Lake. The three Minnesota mounds were much more productive than the other sites and have a greater range of animals; In addition to the previously mentioned species, there were three lagomorphs, woodchuck, two species of chipmunks, three species of squirrels, porcupine, gray wolf, domestic dog, black bear, marten, fisher, striped skunk, river otter, lynx, bobcat, white-tailed deer, and bison (Lukens 1973: 40).

While most of the resources can be obtained locally, there is evidence for utilization of more than one resource zone. The Heron Bay Site contained shellfish fragments that "undoubtedly came from a limestone area, probably southern Manitoba or south of the Great Lakes" (Wright 1967: 41). The Minnesota mound faunal remains included white-tailed deer, woodchuck, cottontail and bison, which would be found in open woodlands or broken Deciduous Forest, in sufficient quantities to preclude being occasional stragglers (Lukens 1973: 44). The presence of these animals demonstrates that the groups shifted subsistence emphasis to include the Parkland resources on at least a seasonal basis. The presence of copper at both the Ontario and Minnesota sites demonstrates the movement of this raw material throughout much of the southern Boreal Forest to the north and west of the Great Lakes.

Subsistence activities of the Lake Forest Middle Woodland of Michigan, as reconstructed by Fitting (1970: 99, 129-142), is similar to that of historic Chippewa, in which large summer villages relied heavily upon fishing while small winter camps relied upon hunting. The large lakeshore sites tend to have few projectile points, numerous scrapers, abundant fish remains, toggle head harpoons, and unilaterally barbed harpoons. There is no evidence that horticulture was being practised, and the only evidence of wild plant resources is nuts, although this may reflect a research strategy that omitted water flotation.

The Laurel Composite has been related to other Middle Woodland sites primarily upon the basis of certain decorative techniques on the ceramics such as dentate stamping (Wilford 1955; Wright 1967). The Malmo Composite was originally identified as a focus of the Mille Lacs Aspect for central Minnesota (Wilford 1943, 1955). It was recognized as an intermediate between Laurel and Hopewell, but was found to exhibit all of the burial practices and Woodland ceramic surface treatments (Wilford 1955: 134-135). Three dates ranging from 690 B.C.±200 (I-787) to A.D. 450±150 (I-788) (Johnson 1964: 44-45) overlap with the early part of the Laurel period. The Malmo materials are currently being reassessed.

To the east of the Laurel and Malmo materials are a series of emerging classes of Middle Woodland materials, e.g., Point Peninsula, Saugeen, Nottawasaga and Nokomis materials (Wright 1967, 1972b; Stothers 1975; Conway 1975a; Salzer 1974; Hamalainen 1975). Saugeen materials have been assigned to the Middle Woodland stage on the basis of the presence of some Laurel sherds identified at the sites (Wright 1967, 1972; Stothers 1975). Conway (1975a) assigns Saugeen to the Early Woodland. Two dates of 530 B.C. ± 60 (S-119) and 677 B.C. ± 220 (C-192), the presence of pottery resembling Marion Thick pottery, and Adena-like points suggest strong affinities with the Early Woodland materials (Stothers 1975; Wright 1972). The presence of copper panpipes, mica sheets, and ear spools suggest Hopewellian influences. Further research is required to clarify whether Saugeen materials represent a continuum cross-cutting both Early and Middle Woodland stages or if mixed assemblages have been treated as single units.

The Point Peninsula materials are found in southeastern Ontario, southern Quebec, and northern New York (Wright 1967, 1972; Stothers 1975). Dates of A.D. 128± 200 (M-850) and 80 B.C. ± 200 (M-428) represent a temporal span that overlaps early Laurel (Wright 1967). The similarities in the Laurel, Point Peninsula, and Saugeen materials have been interpreted as evidence of strong genetic relationships (Wright 1967: 126).

The Nottawasaga of southern Ontario and Nokomis materials of northern Wisconsin have not been described in sufficient detail to make detailed comparisons with the Laurel Composite (Salzer 1974; Conway 1975a). The addition of these new Middle Woodland components may require a re-evaluation of the Middle Woodland relationships on the Upper Great Lakes.

Efforts by MacNeish (1958: 59-63) to define separate Anderson and Nutimik "cultures" for Manitoba have been ignored by subsequent researchers. The Manitoba materials are recognized as being typically Laurel (Wright 1967, 1972b; Mayer-Oakes 1970; Hlady 1970b).

In summary, the Northern Tier Middle Woodland Configuration represents a number of regional and temporal composites of which the Laurel Composite is best known. For the Laurel Composite, at least three different subsistence economies based on hunting, fishing and collecting were practised:

a) seasonally intensive utilization of fish resources on the Upper Great Lakes followed by diffuse hunting;
b) seasonal shifts across Mixed Conifer-Hardwood and Parkland biomes in Minnesota;
c) scattered distribution of sites relying upon diffuse resources in eastern and northern Manitoba and adjacent Ontario.

All of these economies represent nomadic hunters lacking evidence of social stratification; there are no large earthworks, status burials associated with tomb burials in large mounds and elaborate sociotechnic grave goods, nor features that reflect sedentary settlements.

Sites of the Laurel Composite demonstrate that the occupants were involved in trade networks. Occasional Hopewellian items appeared in graves. Non-local raw materials such as Knife River Flint and grizzly bear canines (Webster 1973) were either traded through the Hopewell system or more directly through contact with groups of the Northeastern Plains.

There is also some evidence that specific groups were involved in long-distance seasonal movements. Occupants of the Heron Bay Site (on the northeast shore of Lake Superior, Figure 19, number 17) had obtained shellfish from southern Manitoba or some area south of the Great Lakes (Wright 1967: 41). Encampments occupying the mixed Conifer-Hardwood Forest of northern Minnesota had shifted to the Parkland seasonally to hunt.

The emergence of the Laurel Composite has been interpreted as:

a) Archaic populations adopting ceramics (Jansen 1968; Wright 1972b);
b) the appearance of pottery-producing peoples moving into areas occupied

by Archaic hunters (Wright 1967).

The relative merits of these hypotheses have never been assessed with respect to biophysical limitations, possible external influences, and a systematic assessment of the important variables. The Laurel Composite can be accounted for by the following:

Hypothesis 2

The Laurel Composite represents population movement and displacement into the Boreal Forest.

The substantiation of this hypothesis depends upon two lines of evidence:

a) the nature of human activity as reflected in the ethnohistoric record;
b) the archaeological record.

From the ethnohistoric record, we can deduce that:

a) groups were highly mobile and capable of utilizing large territories, particularly when the resources were diffuse, e.g., northern Algonquians in the Boreal Forest;
b) groups in the Boreal Forest developed a series of regional, agamous (able to marry inside or outside the group) bands with separate identities based upon local landmarks and/or noted leaders;
c) given the population "explosion" and development to the south of the Great Lakes, groups would have been displaced northward in a "domino effect". The impact of the development of Hopewellian chiefdoms on Upper Great Lakes groups parallels the westward displacement of tribes as a result of the fur trade.

From the archaeological record, we should be able to identify:

a) a sudden and rapid expansion of new assemblages;
b) a sharp break in technological and stylistic traits between the previous Shield Archaic and the new intrusive assemblages;
c) the development of regionalization in stylistic variation as groups become regionally distinctive.

The archaeological record is of only limited value in substantiating these premises. Dates from northern Manitoba, Ontario, Minnesota, and Michigan include a series of early dates ca. A.D. 30 throughout this vast area; there is no evidence of consistently early or late basal dates. The present set of dates confirm a rapid, widespread appearance of the Laurel Composite.

Evidence for a sharp break in technology is inconclusive. Laurel assemblages do contain new items such as ceramics. Furthermore, the Laurel ceramics appear as well-made vessels made by skilled craftsmen; there is no evidence of sites with inferior pottery reflecting development of a new skill by artisans who were previously unfamiliar with ceramic manufacturing.

Evidence for a sharp break in nonceramic technology cannot be clearly demonstrated because the previous Shield Archaic has been defined primarily on the basis of surface sites, collectors' samples, and excavations in sites with collapsed stratigraphy (Wright 1971, 1972a, 1972b). Furthermore, there are only a handful of dates for the entire Shield Archaic which spans an estimated 3,000 years.

The process of regionalism has been clearly demonstrated. Mounds are confined to northern Minnesota and the adjacent, southern boundary of western Ontario. Copper is associated with Laurel materials in the eastern area of the geographical distribution. Within the Laurel sites of northern Minnesota, several complexes (phases) have been distinguished on the basis of ceramic decoration and burial practices (Stoltman 1973).

Early Ceramic Plains Village Configuration

Central and Northeastern Plains

During the period when the Hopewellian Interaction Sphere arose in the Riverine-Midwest to the south of the Great Lakes, and the Laurel Composite appeared in the Upper Great Lakes and adjacent Boreal Forest, a number of related developments took place on the Eastern and Northern Plains which had a direct effect upon the cultural history of Southwestern Manitoba.

There have been a number of efforts to synthesize the data in recent years. Wedel's (1961) work is the most comprehensive and inclusive. However, Wilmeth (1972) has recently synthesized the developments on the Central Plains, Reeves (1970a, 1970b) the Northern Plains, and Byrne (1973) the data from southern Alberta. Only Reeves (1970b) attempted to relate the data to southern Manitoba and even this effort was confined to a few sites. These previous efforts can now be incorporated and modified in light of new data and a new model.

The Early Ceramic Plains Village Configuration refers to a number of archaeological manifestations that appeared on the Plains at the same time as the Middle Woodland Hopewellian developments and persisted until the appearance of the Central Plains and Middle Missouri traditions circa A.D. 900 (Figure 19). Kivett (1970: 93) assigns a temporal range of A.D. 1-900 but indicates that there are a few dates that fall outside of this range, and he also points out that a variety of terms such as period, pattern, horizon, culture and complex have been assigned but does not clarify this terminological confusion. Wilmeth (1972) synthesizes a vast body of data and lumps the sites into four phases plus a focus.

A brief summary and analysis of developments on the Central Plains is warranted because there is evidence of both direct and indirect contact of Early Ceramic Plains Village peoples in Southwestern Manitoba. Subsistence settlement patterns have been characterized by:

a) small village sites of one to four houses lacking large super-structures;
b) sites located along the first terrace above creek valleys;
c) faunal remains emphasizing a heavier reliance upon deer, small mammals and birds, than on bison;
d) horticulture confined to Kansas City Hopewell sites;

e) absence or paucity of tools associated with horticulture, such as the scapula hoe;
f) absence of fish remains and tools associated with fishing;
g) pipes rare except in the Kansas City Hopewell sites;
h) the presence of marine and fresh water shell fashioned into beads and other ornaments accompanying burials;
i) the presence of large ossuaries of 20 to 60 individuals in burial mounds that sometimes include stone-lined chambers;
j) the presence of exotic foreign items such as copper, conch shell, and and other marine shells;
k) a series of regional and temporal variations in pottery and projectile points (Kivett 1970: 96-101; Wedel 1961: 88-92).

Wilmeth's (1972) four phases provide a useful framework for understanding developments in the Northeastern Plains.

According to Wilmeth (1972: 9) the earliest ceramics to appear on the Plains indicate a diffusion to the Central Plains during Griffin's (1958: 11) Middle Hopewell Period, which is equivalent to Struever's (1964: 93) Hopewellian phase of the Havana Tradition, and probably the Bedford and Ogden Phases of the Middle Woodland (Griffin et al 1970: 1-9). Wilmeth (1972: 9) argues that there is no evidence for earlier ceramics such as Marion Thick and other pre-Havana types, nor evidence of Early Hopewell or Early Havana Phase materials.

Wilmeth lumps all of the sites with what he considers to be similar ceramics into major phases (Table 5). His descriptions indicate considerable variability in the ceramics, projectile points, and other lithic tools within each phase, but he fails to consider the implications of this variability and of his tendency to lump these materials. Since research is still very much in a pioneer state and since continuing research indicates increasing evidence of consistent variations both within and between ceramic complexes, I have chosen to keep these complexes separated wherever possible.

TABLE 5

SELECTED SITES OF THE EARLY CERAMIC PLAINS VILLAGE CONFIGURATION OF THE CENTRAL, NORTHEASTERN, AND NORTHWESTERN PLAINS

Archaeological Units and Sites	References	C-14 Dates	Comments
KANSAS CITY HOPEWELL COMPLEX			
Villages			
1. Renner	Wilmeth 1972:13 Griffin 1958 Crane & Griffin 1959:180	A.D.8±250(M-572) A.D.108±200(M-571) A.D.430±210(M-573) A.D.680±250(M-454)	Village Site
2. Trowbridge	Wilmeth 1972		Surface collection
3. Perry	Wilmeth 1972		Surface ceramics
4. Kelly	Wilmeth 1972		Small sample of sherds
5. Wichman	Wilmeth 1972		Small sample of sherds
6. Leahy	Wilmeth 1972		Mainly ceramics surface?
7. Dike	Wilmeth 1972		Surface
8. Brous	Wilmeth 1972		Test pits
9. Streeter	Wilmeth 1972		Surface
10. Ward	Wilmeth 1972		House with 20 foot diameter
11. Pottowf	Wilmeth 1972		Included on the basis of one sherd
12. Gilligam	Wilmeth 1972	A.D.550±250	Surface collection
13. Honiger	Wilmeth 1972		Test pits; two sherds
14. 14WO203	Wilmeth 1972		
Mounds			
15. Renner	Wilmeth 1972		Extended & bundle burials Covered with limestone slabs
16. Babcock B	Wilmeth 1972		Elliptical slab enclosure
17. Younkin	Wilmeth 1972		Stone slab mound; projectile points same as Schultz specimens
ORLEANS COMPOSITE (Keith, Valley, and Ash Hollow Complexes)			
18. Woodruff Ossuary	Libby 1955:737 Wedel and Kivett 1956	A.D.610±240(C-928)	Solid carbon sample
19. Medicine Creek (25FT18)	Wilmeth 1972:91 Crane and Griffin 1960:40 Long & Mielke 1966:415	A.D.820±200(M-841)	
20. Massacre Canyon (25HK13)	Wilmeth 1972:93 Crane and Griffin 1958:5	A.D.370±100(SI-126) 130B.C.±250(M-181)	Shell sample, considered too early
20a. Taylor Mound (14DP3)	Wilmeth 1972:96 O'Brien 1971:176 O'Brien 1971:176 O'Brien 1971:176	A.D.10±140(M-2343) A.D.10±140(M-2345) A.D.290±140(M-2344)	
21. Schultz (25VY1)	Crane and Griffin 1958 Wilmeth 1972:105	1880B.C.±(M-182)	Valley 1; Shell date is too early
22. Kelso (25HO23)	Crane and Griffin 1960:39 Wilmeth 1972:114	A.D.800±200(M-637)	
23. Sherman County Site (25SM2)	Wilmeth 1972		Both Valley and Harlan materials
24. Ough	Wilmeth 1972		
25. Two Dog	Wilmeth 1972	A.D.1050±100(Gak-296)	Considered too late
26. La Roche (39STD) Component D	Neuman n.d. Hoffman 1968		Neuman identified it as Sonota; Hoffman as Valley
SONOTA COMPLEX			
North and South Dakota			
27. Grover Hand (39DW240)			
Mound 1	Neuman n.d.:153	A.D.1300±200(SI-167)	Date not considered valid
Mound 2	Neumann n.d.:161	A.D.310±80(I-168)	
Mound 3	Neumann n.d.:167 Deevy, Flint and Rouse 1964:185	A.D.230±75(SI-48)	

TABLE 5 (Continued)

Archaeological Units and Sites	References	C-14 Dates	Comments
28. Arpan Mound 1 (39DW252)	Neuman 1975: 63	A.D.100±90(SI-311)	
29. Boundary Mounds (32SI1)			
Mound 1	Neuman 1975: 70	A.D.410±160(I-499)	
Mound 2	Neuman 1975: 73	A.D.610±150(I-498)	
Mound 3	Neuman 1975: 77	250B.C.±125 (I-414)	
30. Baldhill Mounds (32BA1)			
Mound A	Neuman 1975: 79	A.D.90±150(I-497)	
31. Schmidt Site (32MO20)	Neuman 1975:		
32. Alkire Mound (32SI200)	Neuman 1975: 80	A.D.300±200(SI-310)	
33. Porcupine Creek Component (32SI6)	Neuman 1975		Pottery similar to Boundary Mounds; Obsidian hydration band similar. Predominance of Knife River flint
34. Swift Bird Mound 1	Neuman 1975: 42	A.D. 125± 120(I - 718)	
Swift Bird Mound 2	Neuman 1975: 45	A.D.350±100(I-719)	
35. High Butte (32ME13)	Wood & Johnson 1973	A.D.350±140(M-1428)	
36. Arp Mound (39[illegible]R101)	Wood & Johnson 1973	A.D.780±200(M-1421)	
37. Indian Hill Site (32M22)	Neuman		
Manitoba			
38. Richards Kill Site	Hanna 1973	A.D.575±120(GX-2059) A.D.710±130(GX-1193)	
38. Richards Village Site	Richards 1974, Pugh 1974, Hlady 1967		
39. Zeb Montroy Site	Vickers 1948c; 1950		
Saskatchewan			
40. Walter Felt, Layer 10	Kehoe 1966:160, 1973	A.D.415±80(S-201)	Samantha points
Walter Felt, Layer 13	Kehoe 1966:160, 1973	A.D.340±70(S-200)	Besant points
Alberta			
41. Muhlbach Site	Gruhn 1971	A.D.680±150(GSC-696)	
LOSEKE COMPOSITE			
42. Walker Gilmore Site	Wilmeth 1972:179	A.D.920±150(M-1129)	
43. Feye Site	Kivett 1952:43-45, 59-70		
44. Lawson Site	Kivett 1952:47-57, 59-70		
45. Scalp Creek Site	Hurt 1952		
46. Ellis Creek Site	Hurt 1952		
47. Arp Site	Gant 1967:27, 63	A.D.420±120(M-1415)	
	Gant 1967:27, 63	A.D.660±120(M-1417)	
	Gant 1967:27, 63	A.D.750±110(M-1414)	
	Gant 1967:27, 63	A.D.810±120(M-1420)	
SNYDER DAM COMPONENT			
48. Snyder Dam Site	Syms 1974a:16-21	A.D.830±75(S-683)	
	Syms 1974a:16-21	A.D.940±60(S-741)	
	Syms 1974a:16-21	A.D.1025±70(S-739)	
	Syms 1974a:16-21	A.D.935±39	Combination of three dates

TABLE 5 (Continued)

Archaeological Units and Sites	References	C-14 Dates	Comments
AVONLEA			
49. Head-Smashed-In (Layer 2c)	Reeves 1972a:260	A.D.305±130(GX-1252)[a]	
		A.D.90±120(GAK-1475)	
		A.D.615±95(GX-1399)	
Head-Smashed-In (Test X, Layer 14)	Reeves 1972a:260	A.D.620±85(GX-125)	
Head-Smashed-In (Test X, Layer 15)	Reeves 1972a:260	A.D.940±140(GSC-983)	
Head-Smashed-In (Test X, Layer 19)	Reeves 1972a:260	A.D.90±120(Gak)-1475)	
Head-Smashed-In (Test X, Layer 22)	Reeves 1972a:260	A.D.615±95(GX-1399)	
50. Avonlea	Reeves 1970a:259	A.D.450±100(S-45)	
51. DIPk-3	Reeves 1970a:259	A.D.625±120(GX-1190)	
52. Garratt	Reeves 1970a:259	A.D.500±70(S-?)	
(Level 6)	Reeves 1970a:259	A.D.670±60(S-?)	
53. Gull Lake (Level 26)	Reeves 1970a:259	A.D.660±60(S-254)	
Gull Lake (Layer 31a)	Reeves 1970a:259	A.D.210±60(S-255)	
54. Morkin (Level 4)	Byrne 1973:253	A.D.1390±210(GX-2058)[b]	
	Byrne 1973:253	A.D.760±130(GX-2294)	
	Byrne 1973:253	A.D.745±90(GX-2057)	
Morkin (Level 5)	Byrne 1973:253	A.D.610±130(GX-2296)	
55. Avery	Joyes 1970		
56. The Pas	Tamplin 1973		
57. Richards Village	Richards 1974; Pugh 1974		
58. Manly Bell Site	Unpublished		
59. Timber Ridge	Reeves 1970a:260	A.D.970±110(GX-1195)	
60. PK Ranch	Reeves 1970a:259	A.D.1050±240(A-548)	
BESANT			
49. Head-Smashed-In (Layer 3A)	Reeves 1970a:257	A.D.490±90(GX-1220)[a]	
51. DIPk-3	Reeves 1970a:257	A.D.520±105(GX-1189)	
61. Kenny (Layer 6)	Reeves 1970a:257	A.D.490±110(Gak-1354)	
	Reeves 1970a:257	A.D.1250±60(S-271)[a]	
Kenny (Layer 8)	Reeves 1970a:257	A.D.350±60(S-272)	
62. Morris Church	Reeves 1970a:258	A.D.1170±50(S-120)[a]	
63. Mortlach (Layer 4B)	Reeves 1970a:258	A.D.370±159(S-22)[c]	
(Layer 4E)	Reeves 1970a:258	450B.C.±173(S-28)[c]	
40. Walter Felt (Layer 10)	Reeves 1970a:258	A.D.415±80(S-201)	May be Sonota
Walter Felt (Layer 13)	Reeves 1970a:258	A.D.415±90(S-260)	

a) Unacceptable to Reeves (1972b: 324-326)

b) Unacceptable to Byrne

c) Questionable because it is based on solid carbon technique

Kansas City Hopewell Complex. The Kansas City Complex (referred to as a phase by Wilmeth) was initially formulated by Wedel (1943). The complex is confined primarily to the Kansas River and its tributaries although a few sites occur elsewhere in Kansas and Nebraska. Wilmeth (1972: 12-57) combined the data from the Renner Site and mound, three village sites that had been tested, three mounds, and surface collections from eight village sites. The Renner Site provided the most comprehensive sample data. Floral and faunal remains included small amounts of corn, beans and wild plant remains, predominance of deer with lesser amounts of bison and small animals, mainly turkey remains among the bird specimens and minor quantities of fish and reptiles.

The pottery was described as follows:

> Most vessels were jars with slightly constricted necks, and generally with a flat lip, sloping to the interior, although some lips are rounded. Bases were conoidal or rounded . . . a bowl form, sometimes with an intruded lip, was reported. (Wilmeth 1972: 15)

A variety of surface finish and decorative motifs were described. Most of the vessels had smooth surface finish with cross-hatch incising or dentate rocker stamping on the exterior. Zone stamped scroll work or a row of interior punctates and exterior bosses with vertical incising, stamping or cord-wrapped stick impressions above the bosses occurred in fewer numbers. Finally, a small sample of vessels covered with overall cord-marking was present.

Wilmeth (1972: 19, Plate IV) found that the characteristic projectile point of the Kansas City Hopewell was corner-notched or had an expanding stem with many having distinct barbs on the shoulder. In addition to a wide variety of utilitarian items such as axes, celts, awls, and bifaces, there were a number of specific items of importance in the trade networks; these were limestone funnel-shaped objects, socketed projectile points, imitation bear canines, sheet copper, a copper adze blade and a spatulate-shaped copper rod.

The mounds contained both extended and bundle burials, the former usually covered with limestone slabs. In Babcock B mound, human bones were scattered around the wall of the elliptical stone chamber.

Kansas City Hopewell dates range from A.D. 8± 250 (M-572) to A.D. 680±250 (M-454) (Table 5). This range is found within the four dates from the Renner Site. The sample of dates is too small and the temporal range is too large to determine any clustering. There is no evidence to suggest that the Kansas City Hopewell falls within the narrow temporal range of A.D. 1-200 estimated for the Middle Hopewell of the Illinois valley (Griffin et al 1970: 1-9).

The Kansas City Hopewell and Illinois Hopewell demonstrate similarities and differences. Unlike the Illinois Hopewell sites, the Kansas City Hopewell sites are:

a) located predominantly in valleys of minor streams;
b) have yielded little evidence of native cultigens (although this may well reflect the bias of field techniques rather than adaptive changes);
c) indicate that mammals were more important and molluscs were less important;
d) have greater numbers of projectile points;
e) have burial mounds associated with the village sites;
f) have stone cysts or chambers in less than 25% of the mounds whereas all of the Illinois mounds had central pits or log tombs (Wilmeth 1972: 60-62).

Furthermore, the Kansas City Hopewell mounds:

a) contained similar pottery but in much different frequencies;
b) lacked the elaborate Illinois bone artifacts but had large numbers of incised bone beads, small disk beads and pins;
c) lacked the quantity of copper artifacts;
d) had no evidence of iron, silver, mica, galena and coral.

Projectile point styles also reflect typological differences (Wilmeth 1972: 63-69).

The relationship of Kansas City Hopewell to the Illinois Hopewellian developments has been referred to but little quantitative data has been utilized to derive any sound hypotheses. After comparing numerous traits, Wilmeth (1972: 69-71) is of the opinion that the two groups were different peoples with different subsistence activities, who had little in common except general pottery styles and the burial of the dead in mounds, and that the Kansas City Hopewell sites were major trading centres for such items as obsidian and grizzly bear teeth.

The development of Kansas City Hopewell on the Central Plains and the subsequent regionalism is further evidence of population displacement during the Middle Woodland Stage. The evidence of population displacement onto the Plains strengthens the argument for Hypothesis 2 that there was population displacement to the north. Displacement to the north and west took place at approximately the same time.

The Kansas City Hopewell sites were clearly part of a much larger trade network. They received copper items from the Midwest-Riverine area in only minor quanities, and received none of the more eastern non-local resources such as galena and mica. They were sources of western items such as obsidian and grizzly bear canines.

Orleans Composite. In addition to the Kansas City Hopewell Complex, a number of additional archaeological sites with ceramics have been recorded on the Central and Northeastern Plains (Table 5, Figure 19). A paucity of dates, small samples, and little or no contextual data at many sites have resulted in ambiguity with respect to inter-complex relationships. Materials identified as Valley, Keith, Ash Hollow, and Sonota complexes have been identified. The Valley and Sonota complexes are directly relevant to Southwestern Manitoba and are contrasted in detail.

Wilmeth (1972: 91-163), with his chronological orientation, combined the Valley, Keith and Ash Hollow foci into an Orleans Phase (formerly called an aspect) which was then placed chronologically later than Kansas City Hopewell. The Keith and Ash Hollow foci were then combined into the central and western sub-phase, and the northeastern Valley sub-phase or regional variation was maintained.

Temporally, the complexes of the Early Ceramic Plains Village Configuration are represented by a wide range of dates (Table 5). The dates on shell, e.g., 1880 B.C. (M-182) for the Schultz Site and 130 B.C.± 250 (M-181) for the Massacre Canyon Site, are considered too early (Wilmeth 1972: 96, 105). The date of 250 B.C.± 125 (I-414) for Boundary Mound 3 is inconsistent with the dates from the other two mounds which overlap at one standard deviation. The date of A.D. 1050± 100 (Gak-296) for the Two Dog Site and A.D. 1300± 200 (SI-167) for Grover Hand Mound 1 are considered too late (Wilmeth 1972; Neuman 1975: 53). The remaining sample of dates fall within a range of 100 B.C. to A.D. 1000, using one standard deviation and, within that range, most of the central dates fall between A.D. 200 to 800. There is no indication that the Sonota Complex has any different temporal range from those of the other complexes with the composite.

O'Brien's (1971: 175-176) assessment of the various complexes of the Orleans Composite indicates that there is no agreement on the temporal relationships among the various complexes. Among the alternatives for the Valley materials are:

- a) Keith and Kansas City Hopewell was followed by Valley, Loseke Creek, Eagle Creek and Sterns Creek in sequential order (Kivett 1952);
- b) Valley was temporally equivalent to Mid- and Late-Hopewell and was followed by Keith and Sterns Creek;
- c) Valley was a southern movement into the Central Plains during Late Hopewellian time;
- d) the hypothesis favoured by O'Brien that the Valley Complex was contemporaneous with early Kansas City Hopewell, circa A.D. 1 to 100 ± 100 years was followed by the Keith Complex dating about A.D. 400 to A.D. 800 and the Sterns Creek Complex dating A.D. 500 to A.D. 900.

The Orleans Composite has been characterized by:

- a) subsistence base dominated by large game animals, although the limited data on quantification indicate that deer predominated at some sites and bison predominated at others;
- b) houses, up to ten per site, were characterized by circular to oval basins with hearths and trash pits but little evidence of post molds;
- c) burials were:
    - i) found in pits in special locations set aside from the village or in the village debris,
    - ii) both primary and secondary,
    - iii) accompanied primarily by shell and bone beads.
- d) pottery had generally cord-marked exteriors, with:
    - i) fabric impressions often oriented vertically at the lip,
    - ii) conoidal forms with straight or slightly flaring rims,
    - iii) in certain sites along the northern parts of the Central Plains containing Valley ware, pottery with punctation and exterior bossing, cord-wrapped stick impressions or incised designs.
- e) small projectile points with expanding stems or corner-notching with straight or barbed shoulders;
- f) manos and metates except in the northern sites (Wilmeth 1972: 129-147).

The Orleans Composite materials lacked the ceramic elaboration of the Kansas City Hopewell, lacked the degree of accompanying burial items such as the numbers of ceramic vessels, had a greater portion of bone tools made from bison as opposed to deer, indicated a decline in mound burials, a shift to flexed burials, and the appearance of ossuary and simple pit burials (Wilmeth 1972: 154-163). Village sites associated with the various complexes within the composite tended to be small (seldom more than a few acres) and consisted of a few small ovoid semi-subterranean structures. The presence of semi-subterranean structures and large mound or ossuary cemeteries of 20 to 60 individuals representing several settlements indicate at least seasonal sedentariness (Kivett 1970).

The relationships between the complexes have been hampered by a paucity of reconstructed vessels and a lack of detailed contrasts in ceramics and lithics. While most vessel types share a general similarity in terms of an elongate shape, conoidal base, and predominance of cord-roughened surface finish, a perusal of limited illustrations and specimens of both Valley cord-roughened and Sonota vessels indicates that the differences are greater than the similarities. Kivett (1952: 36-37, 1953: 135-136) found that among his Valley, Ash Hollow, and Harlan cord-roughened types, the detailed differences were greater than the general similarities.

Two of the complexes of the Orleans Composite, the Valley Complex and the Sonota Complex, are important for understanding the cultural history, Co-Influence developments, and adaptive utilization of Southwestern Manitoba. On the basis of variation in technology, ceramic style, subsistence, geographical distribution, and temporal parameters for the two complexes, the following is proposed:

Hypothesis 3

> During the Middle Woodland Stage, Southwestern Manitoba was utilized coevally by two different nomadic Plains groups whose remains have been identified as the Valley Complex and Sonota Complex.

In order to demonstrate this hypothesis, the first two premises must be true, and the latter two premises provide substantiating evidence:

a) two separate complexes can be identified on the basis of technological and/or stylistic variation that do not merely reflect functional differences;

b) the two complexes must overlap temporally;

c) they have different geographical distributions;

d) they have different subsistence economies.

Valley Complex. The Valley Complex is identified on the basis of pottery. The Valley cord-roughened vessels have vertical or spiral cord-roughening (the fabric patterns have not been determined), a distinctive bulge approximately midway on the vessel, relatively straight rim lacking evidence of a shoulder, cord-wrapped rod impressions on the lip, a single row of interior punctates below the lip and/or a horizontal cord-wrapped rod impression, and occasionally incised lines as a decorative technique (Kivett 1949, 1952). Bases are sub-conoidal, i.e., rounded and tapered (Kivett 1949: Plate V, 1952 Plate XXa).

Projectile points consist primarily of barbed, deep-corner-notched varieties. Lithic raw materials are mainly local cherts and quartizites (Kivett 1952).

The data on subsistence activities are limited. However, small- and medium-sized game such as antelope or deer, water birds, turtles, and rabbits were important, whereas, bison, beaver, and canids were of only minor significance (Kivett 1952, 1970). The emphasis is on diffuse, riverine resources with the main Plains staple, the bison, being unimportant.

Most of the data on distribution is restricted to research on the Central Plains. However, sites with Valley Cord-roughened pottery include the Badger component of Good Soldier Site, component D of the La Roche Site (Hoffman 1968), the Hitchell Site (Johnston 1967), Scalp Creek and Ellis Creek sites (Hurt 1952), and the Arp Site (Gant 1967). Sites with Valley Cord-roughened pottery are distributed ". . . on the Plains at least from the border of Kansas, north through

Nebraska, and then generally following the immediate valley of the Missouri River from southeastern South Dakota, northwest North Dakota, and as far west as Havre, Montana" (Neuman 1975: 84). Research in Southwestern Manitoba has extended the known range northward; a reconstructed Valley Cord-roughened vessel was found near the Moore Group mounds (Syms 1971: 24, 45). The Valley Complex is limited to the Plains since nothing similar to Valley Cord-roughened vessels has been found in Minnesota (Elden Johnson 1972: personal communication).

The Valley Complex is at least contemporaneous with and possibly later than Kansas City Hopewell. The limited dates for Kansas City Hopewell span the period of 100 B.C. to A.D. 900 at one standard deviation and a range of A.D. 8 to A.D. 680 when central dates are considered. Similar ranges exist for the Orleans Composite as a whole. A similar estimate seems probable for the Valley Complex although radio-carbon dates are needed to clarify the matter.

In summary, the Valley Complex represents the remains of a group whose core area was the Central Plains and South Dakota with a probable secondary extension up the Missouri River and Souris River basin. Diffuse valley faunal resources and local cherts were the primary resources. Occupation of Southwestern Manitoba was probably minimal, and the region was peripheral to more southerly haunts.

Sonota Complex. The Sonota Complex was defined originally on the basis of excavations at the Stelzer Village Site plus the Swift Bird, Arpan, Grover Hand and Boundary mounds (Figure 21). Neuman subsequently incorporated several other sites from North and South Dakota within the complex. On the basis of his excavations in the early 1960's, Neuman (1975) defined a complex with:

a) an important emphasis upon bison;

b) a predominance of tools made from Knife River flint;
c) a distinctive variation of corner-notched projectile points that subsume Besant and Samatha side-notched types;
d) upright bones in village and kill sites;
e) small burial mounds containing multiple bundle burials as well as numerous bison remains.

These burial mounds averaged approximately 75 feet in diameter and 2½ to 3 feet in height with rectangular central pits that were lined or partially covered with charred or uncharred logs. The bundle burials clustered in groups about the pits often consisted of both adults and sub-adults mixed together. The burials frequently contained small patches of hematite and limited numbers of burial items, including pottery characteristic of the Stelzer Village Site, diagnostic corner-notched projectile points, an occasional obsidian scraper or biface, beads made from olivella and dentalium, the occasional atlatl weight, pendants of bear canines, imitation bear canines, a shell thunderbird, gravers, knives and worked flakes. The burial pits associated with the Swift Bird, Arpan, and Grover Hand mounds included from 8 to 80 individuals (Bass and Phenice 1975). In addition to the human burials, there were numerous whole or partial carcasses of bison buried within the mounds: Swift Bird Mound 1 contained two fully articulated skeletons of bison, plus additional skulls; Arpan Mound 1 contained parts of 48 bison.

The Sonota ceramics are sufficiently distinctive that Neuman (1975: 12) does not believe that they should be lumped under previous types. Like other Orleans Composite vessels, they are shoulderless, conoidal forms but they lack the distinctive bulge common to some types. Reconstructed vessels have straight walls and rounded bases. Most vessels have a vertical cord-roughened surface. Despite the apparent differences observed in the textile impressions on Sonota vessels as contrasted with Valley and Harlan Cord-roughened types, no study of the textile impressions has been made to ascertain the nature of the differences. Decoration consisted primarily of a single row of exterior punctates although one vessel had an alternate boss and punctate design and one had a row of punctates plus a series of oblique dentate stamp impressions (Neuman 1975).

The vast majority of tools and waste flakes were made from Knife River flint which was quarried in western North Dakota (Clayton et al 1970). The flint knappers had an apparent disregard for wastage of this material and made awls on long blade-like flakes, spoke shaves on small portions of large lamellar flakes, and reworked the edges of small portions of larger flakes. The projectile points had a distinctive side- or corner-notched basal form, a width within a relatively narrow range of approximately 18-26 mm, and broad range of lengths from 16 mm to greater than 67 mm. Large numbers of bifaces were also present (Neuman 1975). There is no other complex on the Northeastern Plains that has the same high frequency of Knife River flint.

The distribution of the Sonota Complex is confined primarily to the Northeastern Plains of North and South Dakota and southern Manitoba although Sonota sites have also been found on the Northwestern Plains of Saskatchewan and Alberta. Among the sites from North and South Dakota that Neuman included within his Sonota Complex are Baldhill Mounds, Alkire Mounds, Indian Hill Site, Schmidt Site, S2SN28, one component from the Porcupine Creek Site, and the early Component D from the La Roche Site.

Component D at La Roche has been excluded from the Sonota Complex for this analysis because it had Valley Cord-roughened pottery, barbed projectile points and only one specimen identified as being made from Knife River flint (Hoffman 1968: 25-27, 43-44, Plate 16D). These traits are more characteristic of the Valley Complex.

Recent research in south-central Manitoba has resulted in the recognition of a series of Sonota sites in the Killarney Locality of the Pembina Valley region to the east of the research region (Hlady 1967; Reeves 1970b; Richards 1974; Pugh 1974). The Richards Kill Site was excavated by a local farmer and subsequently tested by members of the Manitoba Archaeological Society in the mid-1960's; the final results have not been published but a preliminary report indicated typological uniformity of projectile points and an almost total reliance on Knife River flint, i.e., 112 of 117 tools made of the material (Hlady 1967). These materials were originally defined as Besant, but they are definitely Sonota as indicated by:

a) identical projectile points including long forms;
b) almost total use of Knife River flint.

On the same quarter section is the Richards Village Site. A large surface collection (Richards 1974) consists of Sonota materials, almost all made from Knife River flint, one obsidian projectile point, pottery that appears similar to the Sonota materials, atlatl weights, large bifaces, trade blocks and nodules of Knife River flint, large awls similar to the forms found at Stelzer, and small grooved mauls similar to the Sonota specimens. In combination, these demonstrate a complex virtually identical to the Stelzer Site and related mounds. Excavations during 1974 disclose that Richards Village is a multi-component site; ceramics found in the Sonota levels are different from ceramics found in the later occupation (Pugh 1974: 6). At least one burial mound is associated with this village site. The

Richards Village Site is one of five sites containing the Sonota Complex within a two mile radius (Richards 1974).

Evidence of other Sonota sites in the near-by Pembina River valley include the Zeb Montroy Site (Vickers 1948c: 4, 1950: 10). A recent perusal of the Birnie Montroy collection indicated that the artifacts were virtually identical to the Richards Village Site materials. Furthermore, several collections from Southwestern Manitoba provide evidence that Sonota sites exist within the research region.

On the Northwestern Plains of Saskatchewan and Alberta, the Sonota Complex was found at the Walter Felt bison kill (Kehoe 1974) and Muhlbach bison kill (Gruhn 1971) where it was identified as Besant-Samantha and Besant respectively. The Muhlbach Site like other Sonota sites, contained the characteristic projectile form. Most of the tools were made from Knife River flint (e.g. 89% of the bifacially worked projectile points and 84% of the projectile points made on trimmed flakes), and bone uprights were numerous.

The subsistence emphasis of Sonota hunters was clearly bison. The Stelzer and Richards village sites yielded primarily bison. The Richards Kill, Walter Felt, and Muhlbach sites were bison kills. Bison were important spiritually, and parts of as many as 48 bison were found in Sonota mounds. Secondary faunal resources were elk and canids at Stelzer and probable elk and muskrat at Richards Village.

Gruhn (1971: 145) considered the idea of Missouri River hunters ranging into Alberta on a bison hunt as far-fetched, but we now know that historic tribes like the Assiniboin ranged over long distances on trading, hunting and warring expeditions. While it is unlikely that a group living in the Dakotas would migrate to the northwestern fringes of the Northwestern Plains for the sole purpose of hunting bison, we must realize that groups in the pre-horse era left their core territory or homeland in order to trade. Furthermore, tribal groups consisted of semi-autonomous bands who gradually moved over large areas. Thus, there is every reason to believe that sites such as Muhlbach were left by part of a society which manufactured the Sonota Complex.

The importance of Knife River flint is universal among Sonota kill and village sites. The percentage of Knife River flint used for tools was greater than 80% at all sites, regardless of the direction and distance from the quarries. These high frequencies and the large quantities of Knife River flint debris reflect ready access to the quarries. Since the frequency of materials did not diminish with distance from the quarries, the process of trade can be discounted. Sonota hunters included western North Dakota within their seasonal round of movement.

The dates for the Sonota Complex cluster within 100 B.C. to A.D. 1000 at one standard deviation and 1 to 800 A.D. if the central dates are considered. The dates for the Canadian Plains cluster between A.D. 250 and A.D. 800 at one standard deviation. If further dates substantiate this tendency for western dates to be later than the Missouri dates, then a westward shift may be proposed.

Finally, the accessibility of Knife River flint and the occasional items of exotic foreign materials raise intriguing possibilities about the role of trade networks. The Sonota Complex overlapped temporally with Hopewellian developments which involved almost continental trade networks to provide a wide variety of raw materials; among those materials were Knife River flint, obsidian, and grizzly bear teeth from western areas. The Sonota Complex peoples were in a position to provide Knife River flint, and possibly grizzly bear teeth to groups to the east. During these exchanges, small amounts of obsidian, dentalium shells, olivella shells, and imitation grizzly bear teeth were received by the Sonota Complex peoples. However, major socio-religious items such as platform pipes, copper objects, pan pipes, ear spools, fresh water pearls and many items from the Gulf Coast did not reach these people. Exotic burial goods are limited to items that were indicative of individually achieved status; the large caches of exotic items found in Ohio Hopewellian sites are absent.

Sonota and Valley: A Contrast. Despite the co-existence or overlap of Valley and Sonota complexes, they can be identified as two different groups who utilized Southwestern Manitoba very differently. They differed in the following ways:

a) vessel form and surface were different;
b) Sonota projectile points lacked the tanged shoulders and deep notches of the Valley forms;
c) Sonota lithic technology was based on Knife River flint and Valley technology was based on local cherts and quartzites;
d) Sonota hunters relied primarily on focal bison resources and Valley hunters relied on diffuse forest resources of the river valleys;
e) Sonota hunters included Southwestern Manitoba as part of their core area in their seasonal round but Valley hunters used Southwestern Manitoba peripherally with a more intensive utilization of the Central Plains Area.

Loseke Composite. Two other ceramic taxa must be considered in relationship to the Early Plains Ceramic Configuration. The Loseke Composite, formerly referred to as a phase or focus, includes the Loseke and Sterns Creek complexes (Wilmeth 1972: 179-211). It is characterized by:

a) pottery with cord-roughened surface finish and cord-impressed decoration on the lip, generally in horizontal rows but occasionally in alternate triangles or oblique lines over the horizontal rows;
b) a shift to rounded vessels with pronounced flaring of the rims, distinct shoulders and rounded to sub-conoidal bases;

c) increased frequency of side-notched projectile points.

The Loseke Composite sample consists of a limited number of sites in eastern Nebraska, extreme western Iowa, and southern South Dakota (Kivett 1952; Johnston 1967; Wilmeth 1972). Ceramic types include Feye cord-impressed, Feye cord-roughened, Ellis cord-impressed, and Scalp cord-impressed. To date, no vessels or sites have been recorded in Southwestern Manitoba. However, like the Valley Complex, evidence of the Loseke Composite may occur as evidence of at least peripheral utilization.

The definition of the Loseke Composite has been hampered by:

a) the association with sherds that appear similar or identical to Valley sherds;
b) the presence of Great Oasis vessels found at 10 sites in South Dakota (Johnston 1967: 70-71);
c) the absence of clear stratigraphy at most Loseke sites.

On the basis of available data it is impossible to say whether Loseke materials gradually evolved from Orleans materials and later underwent an amalgamation with Great Oasis materials or whether the mixture is post-depositional (Johnston 1967: 66-72).

There are only a few dates associated with Loseke sites. They indicate a temporal span from A.D. 300 to 1200 which overlaps the Orleans Composite.

The absence of stratigraphy at most Loseke Composite sites precludes reconstruction of subsistence activities. The Walker-Gilmore Site yielded evidence of a structure consisting of small posts, thatched roof, fire places, trash-filled pits, and a preponderance of deer, birds, and small mammals (Wilmeth 1972: 179-180). Trash-filled pits, shallow fire pits, and small (5 to 6 feet in diameter) oval basins representing possible house depression were found at the Feye Site (Kivett 1952:

44-47; Wilmeth 1972: 182-183).

Snyder Dam Assemblage. Excavations at the Snyder Dam Site in Southwestern Manitoba yielded evidence of two assemblages. The earlier assemblage belongs to a new, unnamed complex of the Early Ceramic Plains Configuration. Reconstructions of two vessels plus parts of three other vessels show them to be squat, conoidal, slightly constricted below the lip, thick based, and covered with partially obliterated vertically-oriented textile impressions (Syms 1974a). Three dates of A.D. 830± 75 (S-683), A.D. 940± 60 (S-741), and A.D. 1025± 70 (S-739) were obtained from a hearth; these were combined to provide a single "true" date of A.D. 935± 39. Faunal remains were bison.

After detailed comparisons with various ceramic complexes, Syms (1974a: 21-31) concluded that the Snyder Dam I Complex was most similar to Midwest-Riverine ceramics such as Cahokia Early Bluff, Jersey Bluff or Canteen cord-marked wares. Dates for these complexes span A.D. 600-1200 (Goldstein 1973: 7). The dates from the Snyder Dam Site and temporal ranges for the comparative complexes span the Middle and Late Woodland stages. The complex has been placed within the Middle Woodland Stage for present discussion because the pottery, with its conoidal form and vertical cord-impressed surface finish, is more similar in form and decoration to pottery from other Middle Woodland complexes than to pottery from the Late Woodland complexes that have large globular vessels.

Northwestern Plains

On the Northwestern Plains, two possible candidates for the initial use of pottery are the Besant Horizon and Avonlea Complex. Reeves (1970a, 1970b) defined a Besant Phase for the Northern Plains. In fact, he defined a horizon since his criteria of identification was the presence of projectiles with shallow notches at the sides, which he called the Besant Side-notched and Samantha Side-notched projectile points. His sweeping distributional claims incorporated Sonota Complex mounds and sites in the Dakotas, Late Woodland Blackduck mounds, Laurel Composite sites in eastern Manitoba, mounds of Southwestern Manitoba, and a large number of kill sites, cave or rock shelter sites and finally, most numerous of all, surface collections (Reeves 1970a: 89-91, 1970b: 164-166). Reeves included a number of sites with a mixture of Besant points and pottery within his inventory, but Byrne (1973: 446-449) argues that with the exception of his Morkin Site, all the excavated Besant components on the western Canadian Plains yielded pottery found in either highly questionable circumstances such as probable rodent disturbance, or in sites with collapsed stratigraphy.

Besant Horizon. The Besant Horizon has been defined on the basis of projectiles with shallow corner notches. Within this horizon there is tremendous variability which has not been systematically quantified. There is only the most superficial similarity between the squat, very shallow notched projectiles from Old Women's Buffalo Jump (Forbis 1960: Figure 14a-g, Figure 16a-c) and the Morkin Site (Byrne 1973: Plate 27) with the elongate, distinctly notched Sonota forms from Muhlbach (Gruhn 1971: Plate 5), Walter Felt (Kehoe 1974: Figures 2-4), Richards Village (Richards 1974) and Richards Kill Site (Hlady 1967). Kehoe (1974) has attempted to sort these large corner-notched projectiles according to a type-variety model, but his sample was confined to the Walter Felt Site and is of only limited comparative value. After a perusal of the literature, there appears to be a probable correlation for high percentages of Knife River flint with elongate corner-notched forms, and a low frequency of Knife River flint with small, squat, shallow, corner-notched points. The Morkin specimens range from 14 to 39 mm in length (Byrne 1973: Plate 26) and the Old Women's Buffalo Jump specimens range from 25 to 37 mm (Forbis 1963: 106-109, 112). At both sites, Knife River flint is unimportant.

Sites with large numbers of squat Besant projectiles made primarily from Swan River chert occur in Southwestern Manitoba and in regions to the east and north. None of these samples has been described and illustrated adequately to provide a quantitative comparison with Sonota projectiles. Sites containing these squat Besant projectiles lack other Sonota traits such as long awls on blade-like flakes, large spoke shaves, small grooved mauls and atlatl weights.

The definition of Besant needs to be re-assessed. Given the differences in projectile morphology, choice of raw materials, and categories of tools, it is likely that Besant materials represent a separate complex that can be combined with the Sonota Complex at the level of composite or configuration.

The dates associated with Besant sites begin slightly later than Sonota dates. Reeves (1970a: 155) suggests that there was actual physical movement of populations westward into the Upper Missouri and Saskatchewan Basin.

Avonlea Complex. The Avonlea Complex is characterized by distinctive delicate side-notched projectile points (Davis 1966; Kehoe and Kehoe 1968: 28-30; Kehoe 1973; Reeves 1970a: 101-106, 176, 1970b: 166-167, 171), and it co-existed with the Besant-Sonota Configuration. Reeves (1970a: 259-260) recorded 13 dates, two of which were rejected due to stratigraphic inconsistencies (Table 5). Initial dates are estimated at ca. A.D. 150 to 250 and terminal estimates range from A.D. 700 for the Saskatchewan Basin to A.D. 900 or 1000 for the Upper Missouri (Reeves 1970a).

Avonlea is important because it co-exists with the Besant-Sonota Configuration and because it has been found with ceramics at The Pas Site, northern Manitoba, and the Garratt Site at Moose Jaw, Saskatchewan. The Pas date of A.D. 900± 180 (Tamplin 1976: personal communication) and the Garratt dates of A.D. 500± 70 and A.D. 670± 60 (Reeves 1970a) indicate that ceramics existed throughout much of the Avonlea temporal range. The Long Creek Site in southeastern Saskatchewan yielded a sample of pottery in the Avonlea level (Wettlaufer and Mayer-Oakes 1960: 39). A suggestion that the Truman Plain ware and Avonlea projectile points at the Avery Site in south-central Manitoba may be associated (Reeves 1970b: 166) is totally unwarranted because there was no stratigraphic control at the Avery Site.

At present, the ceramics from the Garratt and The Pas sites have not been analyzed. The Garratt pottery is flat-lipped, with a straight rim lacking constriction, a knotted open-netting surface finish, a conoidal base, and a single row of decorative punctations (Kehoe 1973: 124-125). In form and decoration, it has greater similarities to the Sonota pottery than the Valley Cord-roughened pottery.

The Avonlea Complex is often associated with bison drives. Evidence for settlement size or habitation structures is lacking.

The distribution of the Avonlea Complex is restricted primarily to the "Plains west of the Middle Missouri area, north of the Platte drainage, north of the Bighorn-Shoshone Basin, east of the main Rocky Mountains, south of the Boreal Forest in Alberta-Saskatchewan, and the Parkland in Manitoba" (Reeves 1970a: 102). Avonlea points have been found occasionally in Initial Middle Missouri sites but they are probably intrusive or are specimens that have been picked up by the inhabitants because Avonlea and Initial Middle Missouri sites are unlikely to have overlapped temporally. They do not appear in most Sonota sites in the Dakotas but are found in very small frequencies (I would estimate less than 3%) in collections from Sonota-Besant sites in southern Manitoba. They are absent from Boreal Forest sites in Manitoba, and are rare in Aspen Parkland sites, such as the Avery Site, and in Plains sites, such as Riverview I, in Southwestern Manitoba. Examination of numerous collections from Southwestern Manitoba and near-by areas shows that Avonlea points occur rarely. When they do occur, they are generally found at sites which also contain Sonota-Besant-Samantha projectiles. Since Avonlea assemblages do occur in the Northern Plains without accompanying Sonota-Besant materials, since the distribution of the Avonlea Complex and the Sonota-Besant Configuration have different distributions, and, since the Avonlea specimens found with Sonota-Besant materials occur infrequently and in small numbers, it is likely that most Manitoba specimens represent minor examples of exchange between contemporaneous groups.

In contrast to Besant-Sonota materials, Avonlea projectiles are rarely made from Knife River flint (Reeves 1970a: 105; Johnson and Roper 1974: 28). Therefore, the Avonlea Complex is distinguished by both a different projectile style and raw material utilization and probably a regional variation in ceramics.

The emergence of the Avonlea Complex has been discussed at length by Reeves (1970a: 176-187) and Byrne (1973: 454-461) who favour an origin in the previous Pelican Lake materials over the hypothesis of Athabaskan migration. Further research is required to substantiate this interpretation.

Saskatchewan Basin Complex, Early Variant. Byrne's (1973) monumental work on the ceramics of southern Alberta resulted in a ceramic sequence based on the Morkin Site, and numerous surface finds. The modal analysis of the Morkin ceramics was presented as if the components were unmixed yet Byrne (1973: 14-26, 259-260, 286) makes several references to mixture due to rodents, thinning of sterile zones between occupations, and the construction of features through previous occupations which inverted the stratigraphy. This, plus the mixing of assemblages as a result of occupations being laid down on top of one another with no intermittent sterile zone, and the movement of artifacts vertically and horizontally as a result of rodent activity,created an inevitable mixture and "blending" that produced a series of gradual changes in artifact frequencies rather than possible discrete occupations with sharp breaks in artifact categories.

Byrne established a Saskatchewan Basin chronological sequence with a Period I Early Variant estimated to date A.D. 150 or 250 to A.D. 1150, and a Period II and III Late Variant estimated at A.D. 1150 to 1700 and A.D. 1700 to 1850 respectively. His sample is analyzed according to 29 modes involving vessel form (e.g., complex wall profile, insloping rim/concave exterior), surface finish (e.g., smooth, cord marked), and decoration (incised/impressed decoration, dentate stamping, punctate); the modes are then studied as changing frequencies through time. His Class I (Byrne 1973: Plate 3f, Plate 17e-f) with its straight rim, fabric/net surface finish, and single row of interior punctates and external nodes is similar to the ceramics of the Early Ceramic Plains Configuration; the only difference lies in the detail of the cord-roughening which, in the Morkin sample, appears to be a net impression.

Middle Woodland Stage Utilization of Southwestern Manitoba

The re-assessment of previous research and the addition of new data from Southwestern Manitoba provide evidence of the presence of at least four complexes: Sonota, Valley, Snyder Dam, and Besant. It must be emphasized, however, that research is at a pioneer level, that limited excavations have resulted in the identification of one new complex (the Snyder Dam I Complex) and that evidence of other complexes can be expected with future research. Nevertheless, the identification of four complexes for the Middle Woodland Stage is a considerable improvement over previous cultural histories that recognized none or at most one complex (MacNeish 1958; Reeves 1970b).

Given the presence of these four complexes, the shifting resource potential, a series of ethnographic analogs, the Co-Influence Sphere Model, and the cultural developments in different biomes surrounding the region, a number of hypotheses are proposed.

Hypothesis 4

> Southwestern Manitoba was utilized only by a number of nomadic Plains groups (complexes).

Evidence of previously defined Eastern Woodland complexes such as Laurel and Malmo is lacking in the research region. Furthermore, the Laurel Complex is sparsely represented in the near-by Boreal Forest and almost absent in the Aspen Parkland. On the other hand, the Sonota Complex is confined primarily to the Northeastern Plains with westward extensions into the Northwestern Plains; the Valley Complex is confined primarily to the Central Plains with peripheral extensions into the Northeastern Plains; and the Besant Complex is distributed primarily on the Northern Plains. Further research is required to determine:

a) the distribution of a rigorously defined Besant Complex;
b) the evidence of Avonlea assemblages, as opposed to isolated trade points, in Southwestern Manitoba for at least peripheral utilization;
c) the definition, distribution and subsistence evidence of a complex to which the Snyder Dam I Assemblage belongs.

The Plains complexes are confined to the Plains and are not reported from near-by areas such as Minnesota.

Evidence of the groups being small-scale, nomadic hunters is based on the following:

a) pottery of all groups occupying the Northeastern and Northwestern Plains consists of simple, utilitarian vessels;
b) limited evidence of structures from the Central Plains and the Dakotas reveals small, temporary structures lacking a solid infra-structure as was found in the later earth lodges;
c) where evidence is available, sites are small, consisting of six to ten structures with debris scattered over two to ten acres;
d) sites lack accumulations of debris in thick layers or piles like the protohistoric Middle Missouri villages;
e) evidence of horticulture is absent or insignificant outside of the Central Plains;
f) burials lack ornate prestige items or large quantities of non-local raw materials. Evidence of the importance of elite status like that of the Hopewell and, to a lesser extent, Kansas City Hopewell, is lacking. Therefore, there is no evidence that populations could be supported or integrated into a chiefdom level of social organization.

Hypothesis 5

The complexes that are recognized for Southwestern Manitoba overlapped temporally, geographically, and seasonally.

The temporal variable is difficult to control for the Valley and Snyder Dam I complexes because of a paucity of dates. The limited sample of dates for both complexes do fall within the Sonota time range of 100 B.C. to 1000 A.D. at one standard deviation. The single Snyder Dam I date falls outside of the A.D. 1 to 800 range based on central dates. Given the single Snyder Dam I date, it is impossible to prove that the site was occupied when the other complexes existed.

Geographical overlap is evident. All complexes shared a common territory of the Northeastern Plains which included Southwestern Manitoba. Otherwise, their overall territories and territories of intensive utilization varied.

In order to demonstrate seasonal overlap it is necessary to reconsider the shifting resource potential of the early historic period and the resource biases as expressed in the archaeological record. The Sonota Complex represents the remains of Plains bison hunters; the village debris, the bison burials and the bison kill sites attest to the importance of this resource. The historic bison on the Northeastern Plains followed a regular seasonal round of summering on the open Plains near the Missouri Coteau and wintering in the Aspen Parkland, sheltered uplands, and wooded river valleys to the east. Sonota hunters were influenced by a similar cycle. Sites in Southwestern Manitoba would have been used during autumn, winter or spring. The occupants of the Snyder Dam Site and the Besant sites would have been limited to a similar cycle since bison were also important for these complexes.

The Valley Complex may have been in Manitoba at any time of the year since Valley resources were primarily diffuse, woodland resources. There is no evidence to indicate whether bison or woodland resources were being used in Southwestern Manitoba.

Hypothesis 6

> Mobility was important for seasonal utilization within biomes and for trade across biomes but not as part of multibiome resource utilization.

There are three parts to this hypothesis and each must be treated separately.

The importance of mobility on a seasonal basis is based on the following:

a) the main faunal resource was bison which migrated seasonally;
b) groups had to migrate to follow the bison;
c) various groups making up the Sonota Complex had to return to Western North Dakota regularly for raw materials.

The distribution of Knife River flint across the Northwestern and Northeastern Plains is due to groups revisiting the quarries, rather than trade, because it represents the movement of large quantities of basic materials; there is no evidence of diminishing quantities as the distance from the sites increases, and the ethnohistoric record illustrates that quarries were visited directly and considered to be accessible to any ethnic group.

Trade was important across the biomes. The presence of exotic materials such as obsidian, dentalium, and Gulf Coast shell on the Northeastern Plains provide evidence of broad trade networks which spanned much of the continent. No evidence of major trade centres such as the historic Missouri villages, nor processing centres such as prehistoric Hopewellian centres have been located, but the presence of these items reflect interaction among various groups. The use of limited quantities of Knife River flint in the Laurel Composite demonstrates that this material was being transposed from the Northeastern Plains into the Boreal Forest; since the quantities are not large, it was probably traded.

Evidence of multiple biome utilization is limited and evidence of overlap and co-existence by Plains and Woodland groups is absent in Southwestern Manitoba and rare elsewhere on the Northeastern Plains. Sonota sites in southern Manitoba are confined to the Pembina Valley and Southwestern Manitoba regions. Laurel sites appear as far west as the Pembina Valley region but do not appear on the Plains. Any overlap or co-existence is confined to a relatively small zone in the Aspen

Parkland along the Pembina Valley. To the south, Valley and Sonota sites are confined to the Plains and the Malmo Complex is confined to the mixed Conifer-Hardwood Forest biome.

The impact of the Middle Woodland Stage on the Northeastern Plains, Southwestern Manitoba in particular, was very different from the Early Woodland Stage. One of the difficulties in attempting to determine how and why these differences occurred is the lack of data on the Plains Archaic of the Eastern Plains (Wilmeth 1972: 237). Given the available data, the identification of the Plains complexes of the Middle Woodland Stage is best understood by the following hypothesis:

Hypothesis 7

> The Plains complexes of the Middle Woodland Stage represent movements of populations onto the Plains.

Wilmeth (1972: 12-90) has argued that Kansas City Hopewell represents a displacement of people onto the Central Plains. The Valley, Sonota, Ash Hollow, and Keith complexes probably appeared due to the same process with the exception that these complexes represented nomadic Plains hunters rather than the more sedentary village activities of the Kansas City Hopewell communities. Evidence on the Valley and Sonota complexes substantiates the interpretation that these complexes represent different distinct groups (hypothesis 3) since they:

a) appeared at approximately the same time;
b) persisted for approximately the same period;
c) overlapped territorially;
d) differed in many technological items such as form and surface finish of pottery, projectile morphology, use of raw lithic materials, presence of items such as atlatl weights;
e) differed in burial practices;
f) differed in subsistence activities.

These lines of evidence do not support an alternative interpretation such as the diffusion of ceramic technology from woman to woman throughout a series of Archaic complexes. There are no known sites of crude pottery representing initial learning efforts. Also, the adoption of pottery would not have required shifts in the other variables.

There are no series of Archaic complexes to match the Middle Woodland complexes, minus the pottery. The Archaic Composite that existed prior to the appearance of pottery consisted of several Pelican Lake complexes (MacNeish 1958; Reeves 1970a: 34-67, 142-149; 1970b: 160-162, 167-168). Recent evidence from the Cherry Point Site in Southwestern Manitoba shows that McKean-Oxbow occupations, that have traditionally been assigned to a pre-Pelican Lake chronological stage and time period (Syms 1969, 1970; Dyck 1970; Reeves 1973), do, in fact, persist throughout the Middle Woodland Stage and into the subsequent Late Woodland Stage (Haug 1975a, 1975b, 1976).

Since there is little evidence of continuity from Archaic to Middle Woodland complexes, and since the growth of Hopewell chiefdoms in the Midwest-Riverine area can be expected to have created population disruption and displacement, then one can infer that new populations appeared on the Plains.

One final argument that a number of small-scale societies are involved, rather than one society, develops from the ethnohistoric data. The process of fissioning of single groups into a number of separate groups was a common phenomenon; e.g., the Atsina from the Arapaho, the Assiniboin from the Yanktonai, the separation of the Teton from the Santee Dakota and the separation of two or more Crow groups from the Hidatsa. Prehistoric groups which moved onto the Plains were subject to the same forces that created fissioning in the historic groups, e.g., breakdown in the communication and interaction due to separation over vast distances, lack of stability of interpersonal relationships (wife stealing, jealousy, revenge), and conflict of interests in trade relationships.

The end of the Middle Woodland Stage in the Northeastern Plains can be characterized by several groups of co-existing nomadic Plains peoples, most of whom were adapted to seasonal movements based on the bison and who were involved in a series of trade networks that resulted in the movement of items across biomes. In the Boreal Forest to the east and north of Southwestern Manitoba were a series of populations scattered throughout the forest adapted to the diffuse, woodland resources. There is little evidence of contact except for limited trade of materials such as obsidian, Knife River flint, and shells. The following Late Woodland Stage and Mississippian developments resulted in entirely new adaptive strategies, new groups, and new trade relationships.

CHAPTER 6

EFFECTS OF LATE WOODLAND AND MISSISSIPPIAN DEVELOPMENTS ON SOUTHWESTERN MANITOBA

Introduction

During the previous discussion on Middle Woodland developments, the utilization of Southwestern Manitoba was found to be complicated and somewhat different from the historic period. During the Late Woodland Stage, the record becomes more complicated and the adaptive strategies of the historic groups emerged.

In hypothesis 1 (page 203), the ceramic variability of Southwestern Manitoba was attributed to the presence of complexes of numerous co-existing groups during specific time periods as a result of evolutionary change and movements of populations. The Middle Woodland record represented co-existing groups within a single time period. The Late Woodland and Mississippian developments determine whether both in situ evolutionary change and population movements account for subsequent ceramic variability.

Previous research efforts had resulted in the identification of only one complex, the Melita Complex, for Southwestern Manitoba (MacNeish 1954, 1958). However, the data from current research, and re-assessment of previous data within and beyond the research region provide evidence that there were numerous late Woodland complexes in Southwestern Manitoba.

Late Woodland and Mississippian Developments

As with the earlier Middle Woodland, major changes in cultural adaptation occurred during the Late Woodland Stage in the Northeastern Woodland Area, and these changes influenced the cultural history of Southwestern Manitoba. The rise and spread of Mississippian adaptations were also reflected in developments in the Northeastern Woodlands and adjacent Plains. During the early Late Woodland, in the Northeastern Woodlands, Hopewellian utilitarian tools and status items gradually disappeared, and the magnitude and frequency of both burial ceremonialism and exotic trade items declined (Griffin 1967: 186-187). Late Woodland sites were larger and more numerous, the utilization of cultigens was more widespread and efficient, regional symbiosis developed between biotic communities (e.g., hunters of the Boreal Forest exchanged meat and furs for agricultural produce with horticultural villagers in the Deciduous Forest and Conifer-Hardwood Forest), and prehistoric trade networks similar to the historic period were established (Fitting 1970: 143-148). Technological shifts included changes to globular vessels, side-notched projectile points and yearly or seasonal sedentary villages with sturdier, more permanent houses.

The accepted terminal date for Late Woodland is historic contact but there is less agreement on the beginning dates. The earliest dates in Michigan cluster around A.D. 610 to 700 (Fitting 1970: 144), while the earliest dates in Manitoba (associated with the Blackduck Horizon) cluster in the late 700's. Estimates are as variable as the researchers.

Late Woodland developments were coeval with the latter part of the Scandic Episode (A.D. 400 to 800 or 900) which is characterized by climatic amelioration, and the Neo-Atlantic Episode (A.D. 800 or 900 to 1250) which is characterized by further climatic amelioration, more moisture due to tropical air masses, westward shift of the tall grass prairies, and southward shift of the Boreal Forest into the Aspen Parkland (Baerreis and Bryson 1965; Bryson and Wendland 1967; Bryson, Baerreis and Wendland 1970). These changes would have provided the opportunity for changes in adaptation and distribution of various groups.

Any attempt to understand the Late Woodland cultural history of Southwestern Manitoba must deal comparatively with the Southern Boreal Forest, the Upper Great Lakes, the Central Mississippi Valley, the Minnesota-Iowa Plains-Woodland Interface and Upper Mississippi Valley, the Central and Northeastern Plains, and the Northwestern Plains (Figure 15). The developments in these areas affected Manitoba both directly and indirectly through the spread of people and ideas.

Southern Boreal Forest

Two Late Woodland ceramic categories, Selkirk and Blackduck, have been identified. There are two localized forms of Selkirk, the Clearwater Lake Punctate and Grass River materials of northern Manitoba and adjacent Saskatchewan. Eastern, western and northern variations of Blackduck have been recognized (Wilford 1941, 1943, 1955; Vickers 1948a, 1948b, 1949, 1950, 1951a, 1951b; MacNeish 1953, 1958; MacNeish and Capes 1958; Evans 1961a, 1961b; Wright 1963, 1965, 1967b, 1968a, 1968b, 1971, 1972b; Mayer-Oakes 1970; Hlady 1970a, 1970b; Wiersum 1972, 1973; Wiersum and Riddle 1971; Trottier 1973). Each of these categories require re-evaluation since few efforts have been made to assess the data on which previous interpretations have been made, particularly for the Manitoba materials, and because new data make previous interpretations untenable.

Blackduck Horizon

The term Blackduck has been assigned to a ceramic ware (MacNeish 1958), a focus of the Headwaters Lake Aspect (Wilford 1941, 1955; Vickers 1945, 1947, 1949, 1950), a phase (Mayer-Oakes 1970), a tradition (Dawson 1974a), and a culture (MacNeish 1958; Wright 1965, 1970), all of which are based upon pottery with a distinctive decorative motif. Materials assigned to Blackduck categories are distributed over vast areas of the Boreal Forest, Aspen Parkland and eastern margins of the Plains (Figure 20). They also demonstrate regional variations which have created typological problems and as many typologies as researchers. Given this regional variation and vast geographic distribution, I have assigned the Blackduck materials to a Blackduck Horizon for subsequent analysis.

The Blackduck Horizon has undergone a variety of interpretations. It has been assigned to both Siouan-speaking Assiniboin and Algonquian-speaking Ojibwa peoples and to a variety of estimated temporal periods. The present evaluation and assessment of the Blackduck Horizon requires a brief review of these various interpretations and the criteria upon which they are based.

Wilford (1941, 1955) originally defined a Blackduck Focus of the Headwaters Lake Aspect for northern Minnesota primarily on the basis of distinctive pottery with cord-wrapped stick and punctate impressions. He assigned this focus to the late pre-historic and historic Assiniboin on the basis of similarities with pottery found around the Mille Lacs region of Minnesota which was known to have been inhabited by the Sioux.

Vickers (1945, 1947, 1949, 1950) identified a Manitoba Focus of the Headwaters Lake Aspect on the basis of pottery that was very similar to Wilford's and

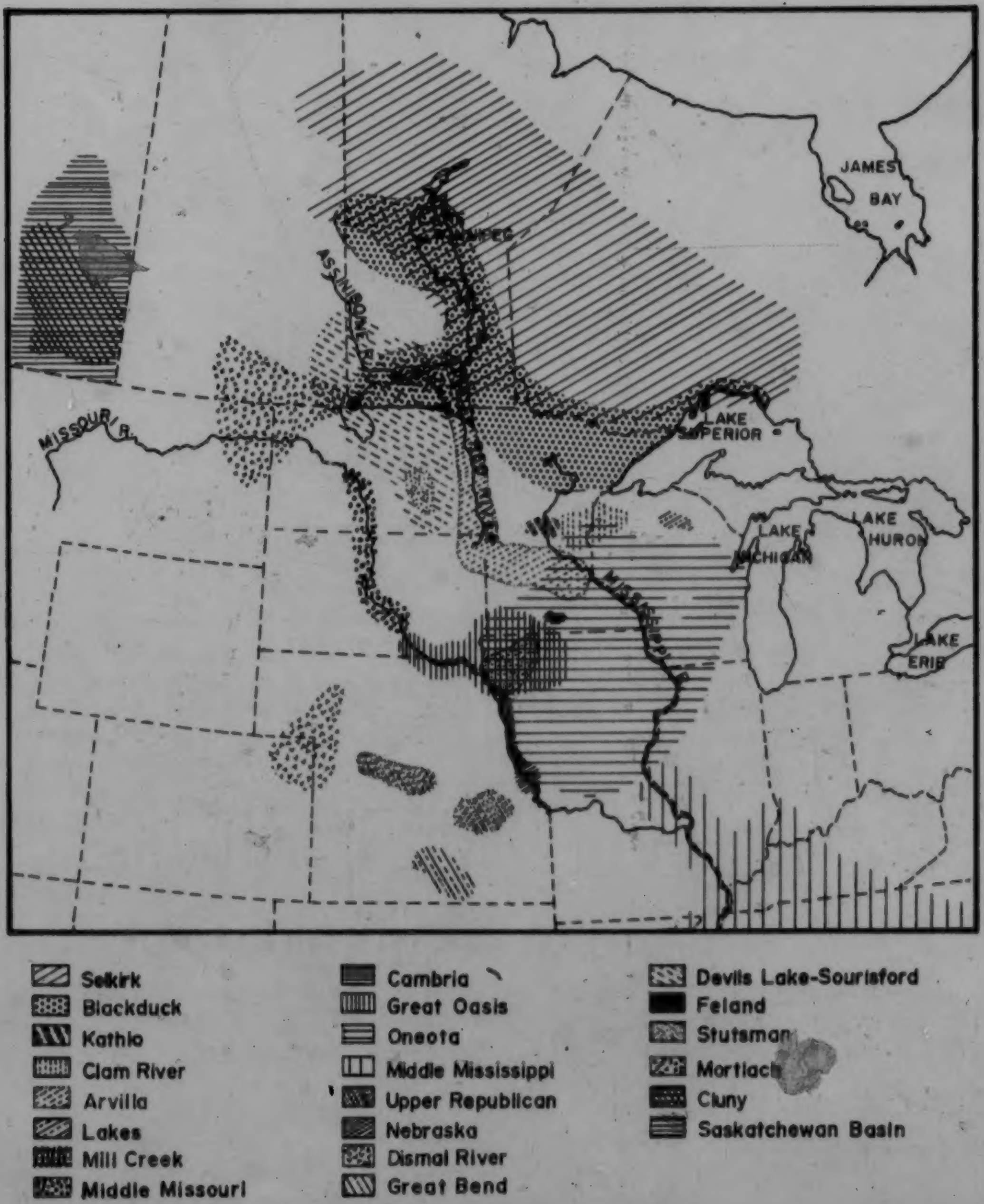

JAMES BAY
LAKE SUPERIOR
LAKE HURON
LAKE MICHIGAN
LAKE ERIE
MISSOURI R.
ASSINIBOINE R.
WINNIPEG
RED RIVER
MISSISSIPPI
Selkirk
Blackduck
Kathio
Clam River
Arvilla
Lakes
Mill Creek
Middle Missouri
Cambria
Great Oasis
Oneota
Middle Mississippi
Upper Republican
Nebraska
Dismal River
Great Bend
Devils Lake-Sourisford
Feland
Stutsman
Mortlach
Cluny
Saskatchewan Basin

Figure 20. Distribution of Late Woodland Sites.

on the presence of mounds with burials in a sitting position accompanied by small mortuary vessels located near village sites that contained some pottery with cord-wrapped stick impressions. On the basis of historic fur-trade accounts, Vickers (1948b) was able to show that the Assiniboin had occupied the mound regions of southern Manitoba by the beginning of the Seventeenth Century but he was unable to prove that the Assiniboin made and used the mounds; one of the limitations was the absence of historic materials in the mounds (Vickers 1949). The excavations by Bird (Bird 1949; Vickers and Bird 1949) at the Stott Site in 1947-49 yielded evidence of a Blackduck Horizon component with a copper bead; the bead was identified as European copper, using a crude chemical test that indicated an absence of silver plus the assumption that a uniformly thin sheet of rolled copper could not be produced by prehistoric Natives. This bead provided the "evidence" that the Blackduck component was probably an historic Assiniboin village (Bird and Vickers 1949; MacNeish 1954). However, the copper bead has subsequently been identified as being made of Native copper (Steinbring 1975: personal communication) and the 1975 Brandon University Field School excavations at the Stott Site uncovered no historic items in any of the components.

MacNeish (MacNeish 1954, 1958; MacNeish and Capes 1958) excavated a number of components which contained Blackduck Horizon materials; he called the materials Manitoba Focus or Culture. The Stott Site along the Assiniboine River valley near Brandon contained a pure Blackduck Horizon component but the other sites merely contained sherd types assigned to this horizon. The Rosser Mound was assigned to the Blackduck horizon on the basis of a few cord-marked sherds found in backdirt from the mound fill, presence of a flexed burial (a pit containing bundle burials was also present), triangular points, a flat-topped triangular end scraper, a half-moon biface, a unilateral barbed harpoon, and bird bone whistles (MacNeish 1958: 49-50). The only diagnostic trait, the ceramics, was found in questionable context.

MacNeish (1958: 76-77) noted the strong similarities between his Manitoba Focus and Wilford's Blackduck Focus. Following Vickers, he subsumed Manitoba mounds with flexed burials (some of which may have been sitting up, but the descriptions are not clear on this issue) within the Manitoba Focus regardless of associated artifacts. As stated previously, characteristic pottery was not found with the burials; at best it was found in mound fill or nearby fields. The only evidence for a possible historic date lay with one dubious historic copper bead from the Stott Site. MacNeish also mentioned relationships between the Manitoba Focus and the Melita Focus of southwest Manitoba, eastern North Dakota, and southeast Saskatchewan; the latter is neither discussed nor defined, but presumably refers to all of the mounds in Southwestern Manitoba (MacNeish 1958: 77, 83). The Manitoba Focus was once again identified with the Assiniboin on the argument that southern Manitoba was the homeland of Assiniboin in the early historic period.

The temporal range of the Manitoba Focus was estimated to be A.D. 1000 to 1350. There were no radiocarbon dates from either the Manitoba or Minnesota sites nor from any other regions. MacNeish (1958: 52-53, 64-65) estimated this date range on the following arguments:

a) The Manitoba Focus was located stratigraphically beneath the Selkirk Focus at the Lockport Site.
b) The Selkirk Focus was estimated to have appeared circa A.D. 1350 to 1400 because a Selkirk component was located in a zone of water-deposited lenses at the Lockport Site which could date to the latter

half of the Fourteenth Century because dendrochronological studies in North and South Dakota indicated a wet period at this time.

c) The Selkirk Focus represented the remains of the Cree and the Cree had replaced the Assiniboin.

d) The initial date of A.D. 1000 apparently was chosen arbitrarily since no discussion was presented for the choice of this date.

It is not known why MacNeish never submitted any radiocarbon samples. His efforts to estimate the time range have several major limitations. First, the attempt to relate a zone of flood deposits along the Red River to a series of tree rings reflecting wet conditions in the Dakotas has no methodological validity. Red River flooding has been recorded throughout the historical period and flood deposits do not necessarily correlate with wet periods as reflected in tree rings. The Red River floods only in the spring, and flood height can be due to the amount of snow fall, amount of spring rain, rate of spring melting and subsequent run-off, and amount of ice on the river. The dendrochronology reflects the moisture accessibility throughout the year. Furthermore, climate on the Northern Plains is highly variable and there may be little relationship between the amounts of precipitation during any year or consecutive years from different regions such as southern Manitoba and South Dakota. In fact, Weakly (1971: 44) states that tree ring chronologies cannot be extended beyond a range of 50 to 100 miles with the shorter distance being more reliable.

A second limitation is the stacked chronological orientation. MacNeish argues that since the (supposedly) Cree, Selkirk Focus materials were found stratigraphically above the Assiniboin, Manitoba Focus materials at the Lockport Site, the Cree had displaced the Assiniboin from the region. This argument implicitly assumes that only one group can occupy an area at any one time. This assumption has been proven to be invalid in previous discussion on the ethnohistoric record. In fact, many historical groups co-existed in southern Manitoba.

MacNeish's description of his Manitoba Focus or culture (he used the terms interchangeably) was based upon data obtained from multi-component sites with collapsed stratigraphy that were excavated in arbitrary six-inch levels. The foci were defined on the basis of certain levels which had a predominance of certain ceramic types. However, the mixture among levels, the crudeness of field techniques, and the failure to record data on scattergrams, post-depositional mixing by rodents, and the degree of this mixture, (e.g., failing to note the mixture of Laurel pottery with Archaic McKean materials [Syms 1969: 50-75]), resulted in contextual descriptions of very limited value.

Despite the problems with the validity of the field data and the limitations of the chronological method, MacNeish's work has been the basis of Capes' (1963) interpretations in Southwestern Manitoba, interpretations of the Manitoba Phase (Mayer-Oakes 1970; Hlady 1970b), and perception and time range of Manitoba Focus materials (Joyes 1969, 1970; Trottier 1973; Jamieson 1974), cultural geographers (Ray 1971, 1974) and ethnographers (Bishop and Smith 1975). Hlady (1970b: 278-279) maintained the Assiniboin ethnic identification but extended the temporal range of the Manitoba Phase from A.D. 1000 to A.D. 1750 or 1800 on the basis of the recorded presence of Assiniboin peoples in eastern Manitoba until A.D. 1750 and along the Assiniboine until A.D. 1800.

In the early 1960's a different interpretive scheme was proposed for the Blackduck Horizon materials in northern Minnesota and western Ontario. Evans (1961a, 1961b) provided a detailed description of Blackduck materials excavated by Lloyd Wilford from seven sites in northern Minnesota. He argued that the Blackduck

Focus should be assigned to an Algonquian group and tentatively suggested the Cree. His reasons for rejecting the Assiniboin identification in favour of the Algonquian identification were:

1. The Late Woodland Blackduck shares more traits with the previous Middle Woodland Laurel ceramics than with the Mille Lacs ceramics, e.g., unilateral barbed harpoons, socketed bone projectile points, cut beaver incisors, mortuary goods with burials, and the presence of the cord-wrapped stick decorative technique.
2. In order for Blackduck materials to be assigned to the Assiniboin, the Assiniboin had to have shifted their burial practices from interment of secondary bundle burials to primary burials and back to bundle burials within two hundred years.
3. The historical account of burial practices by Alexander Henry which have been attributed to the Assiniboin is
   a) vague and questionable with respect to ethnic identity,
   b) inconsistent, if he was referring to the Assiniboin, because he used the Algonquian term "totem" in part of the description.
4. Algonquian burials tended to be primary burials with some eastern groups having flexed sitting burials.
5. The distribution of Blackduck materials in northern Minnesota coincided with the known distribution of Algonquian groups.
6. The Cree and other Algonquian-speaking groups were known to have occupied Minnesota from the earliest contact times (Evans 1961a: 146-154).

Wright (1963, 1965) conducted a survey along the north shore of Lake Superior and international boundary to Manitoba. He argued that the Blackduck/Manitoba foci sites along the north shore should be assigned to the Algonquian-speaking Ojibway because:

a) the sites occurred in what had been regarded traditionally as Algonquian country;
b) a number of the sites were definitely historic, containing French items suggesting a date of A.D. 1650 to 1700 when the Assiniboin were no longer in the area;
c) there was a cultural continuity from the prehistoric to the historic components at the Pic River and Michipicoten sites in such elements as:
   i) the form of the projectile points
   ii) decoration of the rim sherds
   iii) a high frequency of wedges, scrapers, and projectile points (Wright 1965).

He defined his term, Ojibway, as an extremely broad category which included peoples designated as Ottawa, Mississauga, Potawatomi, Sauteur, Amikwa, Nipissing, Ondataouauoat or Cheveaux-Releves, Kishkakon, Mousonee, Nassauaketon, Nikikouek, Sinago, and Gens de Terre (Wright 1965: 190). These tribal groups include not only different linguistic groups but groups with distinctively different subsistence-settlement activities and distributional ranges. His term, Ojibway, has little ethnographic validity other than as a broad category of Algonquian-speaking peoples living around the Upper Great Lakes.

Wright's (1967b) analysis of the Pic River Site represents an important contribution to an understanding of the tool kit associated with Blackduck/Manitoba materials but his ethnic identification is a master piece of compromise. He accepts all ethnic identifications and suggests that the historic Assiniboin, Cree, and Ojibwa were all using Blackduck pottery to varying degrees since Blackduck pottery has been found throughout a territory that was inhabited by all three ethnohistoric groups.

Dawson (1974a, 1974b) attributes Blackduck materials to the Ojibwa, using an even broader linguistic category. He includes Ojibwa, Ottawa and numerous groups of Northern Algonquian speakers within the term Ojibwa, as well as the Cheyenne and Blackfoot to account for Blackduck pottery in the west. The Blackduck Horizon is considered to be the product of a single ethnic group which, in late prehistoric times, were independent Algonquian-speaking bands (Dawson 1974a: 41).

A reassessment of the Blackduck Horizon in Manitoba requires a synthesis of data on:

a) dates;
b) distribution;
c) subsistence emphases.

Recent dates from Manitoba, Ontario and Minnesota (Table 6) suggest that the Blackduck Horizon underwent a widespread expansion into Manitoba and Minnesota during the latter part of the Eighth Century A.D. The two early dates from the Lord Site and Calf Mountain Site[10] in Manitoba and the Scott Site in Minnesota cluster around the late Eighth and early Ninth centuries.

The Martin Bird Site on Whitefish Lake has yielded eight dates of which three, A.D. 200± 205 (S-853), A.D. 630± 85 (S-892), and A.D. 480± 115 (S-772) predate the above mentioned dates. These dates do not appear to correlate with their stratigraphic context, but Dawson (1975: personal communication), believes all of the dates are valid and can be placed in chronological order. If so, the beginning of the Blackduck Horizon approximates the beginning of the Laurel Horizon in western Ontario. Two other dates in excess of 2000 B.P. were also obtained from the site (Dawson 1974b).

If these early dates are valid, they will be substantiated by equally early dates from other sites. At present, however, they appear too early. Dates associated with Late Woodland developments on the Upper Great Lakes indicate that Late Woodland complexes first appeared circa A.D. 600/or 700 (Fitting 1970: 144; McPherron 1967: 269-278; Brose 1970: 189-197).

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[10] The Calf Mountain date was erroneously identified by Reeves (1970b: 159) as a Besant date. The date is based upon bone from a freshly graded ditch wall collected by Chris Vickers. The only artifacts found with the bone were one biface and one Blackduck rim sherd (Vickers 1972: personal communication).

TABLE 6

BLACKDUCK HORIZON DATES

Political Unit	Site	Date (B.P.)	Carbon-14 Date[a]	References
Manitoba	Lord Site	1170±90(S-652)	A.D.780±90	Syms 1974c:18
	Calf Mountain Site	1105±85(GX-1192)	A.D.845±85	Syms 1974c:18
	Stendall Site[b]	965±70(S-786)	A.D.985±70	Hlady 1974:pers. com.
		850±75(S-690)	A.D.1100±85	Rutherford 1973: pers. com.
	Bjorkland Site		A.D. 1330	Buchner 1975: pers. com.
Minnesota[c]	Scott Site	1165±120(I-790)	A.D.785±120	Johnson 1964:45
	McKinistry Mound #2	760±90(I-796)	A.D.1190±90	Johnson 1964:46
		475±110(I-789)	A.D.1475±110	Johnson 1964:45
	Smith Mound #4	600±120(I-794)	A.D.1350±120	Johnson 1964:46
	Smith Village		A.D. 900-1300	Lugenbeal 1975: pers. com.
Ontario	Pic River Site Stratum III	988±80(GSC-85)	A.D.962±80	Wright 1967b:75
	Martin Bird Site[d]			
	Area A[e]			
	Level 1, 2"-4"	1470±115(S-772)	A.D.480±115	Dawson 1974:89
	Level 2, 4"-6"	660±70(S-775)	A.D.1290±70	Dawson 1975:pers. com.
	Level 3, 6"-8"	175±40(S-774)	A.D.1775±40	Dawson 1975:pers. com.
	Level 3, 6"-8"	885±130(S-851)	A.D.1065±130	Dawson 1975:pers. com.
	Area B	320±85(S-852)	A.D.1630±85	Dawson 1975:pers. com.
	Level 1	1750±205(S-853)	A.D.200±205	Dawson 1975:pers. com.
	Level 2	1145±55(S-891)	A.D.805±55	Dawson 1975:pers. com.
	Level 3	1320±85(S-892)	A.D.630±85	Dawson 1975:pers. com.
	Area C (Mound)	1095±180(S-680)	A.D.855±180	Dawson 1975:pers. com.
	Wabinosh River	710±175(S-681)	A.D.1240±175	Dawson 1975:pers. com.
	Site[f]	350±100(S-682)	A.D.1600±100	Dawson 1975:pers. com.
	Hungry Hall Site[g]	745±60(S-109)	A.D.1202±60	Wright 1967b:90
	Pic River Site[g] Stratum I		A.D.1700-1750 (estimate)[h]	Wright 1967b:61

[a] Converted directly to A.D. dates without calculating radiocarbon fluctuations.

[b] It is an unanalyzed and undefined component or components with Blackduck vessels as a minority element.

[c] The Minnesota dates are based on samples collected during the period 1932 - 1960 and submitted in 1963 (Johnson 1964: 35).

[d] Since the levels are arbitrary, samples are from different squares, and the occupation is discontinuous, the dates can be arranged in chronological order (Dawson 1975: personal communication.

[e] Area A and the Mound are pure Blackduck and Area B is a mixture of Blackduck and other materials from northwestern Ontario (Dawson 1975: personal communication).

[f] This is a Blackduck and late Laurel multi-component site (Dawson 1975: personal communication).

[g] Mixture of Blackduck and Selkirk materials.

[h] Estimate is based upon presence of French fur trade items.

Other dates from Blackduck sites indicate continuity to the historic period. However, current evidence suggests that the Blackduck Horizon persisted into the historic period only in Ontario, north and west of Lake Superior. No pure Blackduck components have been found in Manitoba or Minnesota with historic items.

All of the Blackduck sites in Minnesota predate the Fifteenth Century A.D. and lack historic trade goods (Evans 1961a; Johnson 1964, Johnson 1972: personal communication; Lugenbeal 1975: personal communication). The Minnesota data indicate an occupation span from the Eighth to Fifteenth centuries.

Evidence for historic continuity of Blackduck exists only in western Ontario. Stratum I of the Pic River Site (Wright 1967b) plus levels of the Martin Bird Site have yielded mixtures of Blackduck pottery and historic materials. The dates of A.D. 1775± 40 (S-774) and A.D. 1630± 85 (S-852) from the Martin Bird Site confirm an early historic occupation. In addition to these excavated sites, Wright (1963) and Dawson (1974b) have discovered numerous surface sites in which both Blackduck pottery and fur trade items were found. While the association of surface materials is always of dubious value, they do tend to confirm the association of the materials found within undisturbed, excavated contexts.

The distribution of the Blackduck Horizon suggests an even more extensive pattern of multiple zone environmental utilization than for the Laurel Horizon. In Ontario, sites are concentrated along the northern parts of Lake Superior plus the lakes and rivers to the west, particularly in the Whitefish Lake Region. Wright (1963, 1965: 191) noted that his "Ojibway" sites were scarce along the north shores of Lake Huron and Lake Superior during both the prehistoric and historic periods. The area encompassed in Ontario includes the region running from the western part of Lake Superior to the divide separating the Hudson Bay drainage from the Great Lakes drainage, westward to northern Minnesota and southern Manitoba (Wright 1972: 98). In Minnesota, Blackduck Horizon sites are confined to the northern one-third of the state which consists of mixed coniferous and hardwood forests plus shallow lakes, many having wild rice.

In Manitoba, sites are numerous in the southeastern portion of the province along the Winnipeg River and along a series of lakes in the Whiteshell Park. MacNeish (1958: 52) found Blackduck ceramics at the Cemetery Point Site and Tuokko Site. Penny (1970) found Blackduck sherds at 10 of the 20 sites located during his survey of the upper Winnipeg River. Members of the Manitoba Archaeological Society have collected surface materials or excavated materials from the Falcon Lake, Mallard Falls Entrance, Caddy Lake, Whitemouth Falls, Rainbow Falls, Jessica Exit, Basket Falls, Castaway Cabins, Mar, and C3-UN-39 sites (Simpson 1965, 1967; Hlady 1965a; Hlady et al 1971; Trottier 1973). Little can be said about these latter sites since most are surface collections or limited excavations which have either not been analyzed or have only been reported in a preliminary fashion. Crews from the University of Winnipeg have conducted excavations at the Whitemouth Falls, Bjorklund and Porth sites at the juncture of the Whitemouth River and the Winnipeg River (Wheeler et al 1973) and have recorded nearby surface sites with Blackduck ceramics.

Much of the remainder of the Boreal Forest of eastern Manitoba has not been investigated. Saylor (1974) conducted a survey of the Sandilands Region in the extreme southeastern portion and located no ceramic sites. No research has been done to the east of Lake Winnipeg, north of the Winnipeg River, until one reaches the Manigotogan-Wanipegow region on the northeast shore of Lake Winnipeg where Saylor (1975) has located multicomponent sites including Blackduck materials near wild rice grounds. In northern Manitoba where Hlady (1971b) reported sites on a series of lakes and streams between 54° and 57° North latitude, only one Blackduck rim sherd was found in a total of 26 sites, suggesting that this area can be excluded from the Blackduck Horizon range.

Blackduck materials are found at a series of mixed, multi-component or surface sites on the central Red River near Winnipeg, including the Lockport Site and Rosser Mound (MacNeish 1958), the Robins Mound (Hlady 1965a), and the Waddell, Paddon, Wright, Lewin No. 1, Kaito, and Lasko sites (Hlady 1970b). The Red River Region lies within the Aspen Parkland. The presence of Blackduck materials in the Red River Region, Pembina Region, and Assiniboine River Valley shows that the distribution of Blackduck extends into the Aspen Parkland and that evidence of Blackduck is more plentiful than the previous Laurel Woodland materials. In the Pembina Valley, Blackduck pottery occurred in the upper levels of the Avery Site, located on a terrace above Rock Lake (Vickers 1948, 1949; Joyes 1969, 1970). This is a multi-component site with collapsed stratigraphy. Fourteen of the 236 identified rim sherds (5.9%) were Blackduck (Joyes 1969: 155). Other sites yielding Blackduck pottery included the United Church Camp Site (MacNeish and Capes 1958) and the village site near Calf Mountain (Vickers: personal communication).

Despite the paucity of intensive surveys, sites containing Blackduck pottery have been found along the Assiniboine River and within the Southwestern Manitoba Research universe. Along the Assiniboine River, all surface ceramic sites contained

Blackduck pottery (Vickers 1949: 4). One of these, the Stott Site, covers in excess of 100 acres with a burial mound on the valley edge plus village and butchering materials on the terraces and slopes of the Assiniboine valley.

In Southwestern Manitoba, a Blackduck component exists in Occupation 2 at the Brockinton Site (Syms 1972), the latest occupation at Cherry Point Site in the Oak Lake locality (Syms 1974c; Loveridge 1974; Haug 1975), at the Taylor Site (Barber 1975), and Blackduck ceramics occur at the Stendall Site (Colwill 1973). All Blackduck sites in southern and western Manitoba are located along the river valleys or near Oak Lake. The distribution extends along the river valleys into the peripheries of the grassland, but Blackduck sites are much less numerous there than in the Boreal Forest.

To the north, Blackduck Horizon sites are confined primarily to the southern portions of the Boreal Forest. At the north end of Lake Winnipeg, Blackduck ceramics have been found at several sites. In the Grand Rapids Locality, Mayer-Oakes (1970: 11-54) noted Blackduck sherds at nine of twenty sites that yielded diagnostic artifacts. Only the Tailrace Bay Site (GRS-3) was excavated sufficiently for analysis of Blackduck materials. Farther north, intensive surveys of Southern Indian Lake, the Rat-Burntwood River system and the Outlet Lakes system have yielded only four rim sherds of Blackduck ceramics from three sites out of a sample of hundreds of vessels from several hundred sites (Wright 1968; Kelly 1974; Dickson 1972, 1975a; Wiersum 1972, 1973; Hanna 1974). Clearly, the isolated Blackduck vessels in these more northerly regions were trade items.

In Saskatchewan, a survey of portions of the Churchill River yielded little evidence of Blackduck ceramics (Meyer 1975); five vessels were found at three out of seventy-two sites.

An overview of the distribution of the Blackduck Horizon indicates that sites with more than one or two vessels are confined to the southern and western portions of the Boreal Forest from the western portion of Lake Superior to the western fringes of Manitoba. Evidence of Blackduck in Manitoba is insignificant north of Lake Winnipeg. The southern boundaries include the Boreal Forest portions of northern Minnesota and the Whiteshell region of eastern Manitoba, the Aspen Parkland of the lower Red River valley, the Pembina valley and the Assiniboine River valley, and the grassland portions of Southwestern Manitoba. The sites span three biomes.

Many of the data upon which this distribution is based are of little value for specific information on subsistence because:

a) many sites have collapsed stratigraphy and no association of tools and faunal remains with specific components can be defined;
b) the faunal remains or the artifacts have not been studied; and/or
c) the sample size is inadequate or lacking contextual data.

A comparison of faunal remains from "pure" Blackduck sites such as the Stott Site (Bird 1947; MacNeish 1954) in the Aspen Parkland of western Manitoba and the McCluskey Site (Dawson 1974a; Burns 1974) on Whitefish Lake in the Boreal Forest of western Ontario (Table 6), indicate both overlap in some species and mutually exclusive categories with others.

At the Stott Site, the emphasis upon bison reflects an adaptive shift to the Plains, resource-intensive fauna. This orientation is confirmed by the preponderance of bison at the Brockinton Site. The absence of bird remains raises the problem of whether there was a cultural bias against birds when bison were abundant, whether the site was occupied during a season when the birds were not readily accessible

TABLE 7

COMPARISON OF FAUNAL REMAINS FROM THE STOTT[a] AND McCLUSKEY[b] SITES

	McCluskey Site		Stott Site	
Identification	No. of Bones	MNI[c]	Quantitative Comments	MNI[c]
Mammals				
Artiodactyla				
Bison	-	-	Great quantity, 26 atlases	26
Moose	3	1	-	-
Elk	1?	1?	1	1
Deer	-	-	Small number	?
Carnivora				
Black Bear	8	1	4 canine teeth	1
Gray Wolf	-	-	14 jaws plus other bones	14?
Coyote	-	-	Several canines	1?
Domestic Dog	-	-	1 jaw	1
Lynx	-	-	1 claw	1
Skunk	-	-	1 jaw	1
Rodentia				
Beaver	21	2	No. of teeth plus a few bones	1?
Porcupine	3	1	-	-
Red Squirrel	-	-	Several jaws	?
Lagomorpha				
Snowshoe Hare	-	-	5 jaws	5?
Unidentified	168		?	
Avian				
Gaviiformes				
Common Loon	6	1	-	-
Red-throated Loon	1	1	-	-
Ansiformes				
Canada Goose	1	1	-	-
Ring-necked Duck	2	1	-	-
Common Merganser	3	1	-	-
Red-breasted Merganser	2	1	-	-
Unidentified	1			
Falconiformes				
Bald eagle	2	1	-	-
Unidentified	21		?	
Fish				
Perciformes				
Pickerel	4[d]	1	-	-
Unidentified	6		15 vertebrae	?
Reptilia				
Turtle (unidentified)	1	1	-	-
Mollusca				
Clam (unidentified)	-	-	Common	?

[a] Stott Site sample based upon excavation of 157 ft.^{2} (Bird 1947). No systematic quantification.

[b] McCluskey Site sample based upon excavation of 500 ft.^{2} (Dawson 1974). Sample includes materials collected from surface but excludes human and modern, domesticated animals (Burns 1974: 86).

[c] MNI - Minimum number of individuals.

[d] Probably modern (Burns 1974).

given specific hunting techniques, or some combination.

The faunal remains from both sites provide evidence that a variety of animals was utilized. The sample from the McCluskey Site lacks a bias for any particular animal and indicates a diffuse selection of animals from assorted life zones. The Stott Site, on the other hand, reflects a primary reliance upon bison but demonstrates a continued effort at exploiting a variety of environments.

The McCluskey faunal assemblage has been interpreted as a spring to fall occupation period on the basis of the presence of migratory water fowl, bear, and burial tumuli (Burns 1974: 32-83). The Stott mollusca, fish, and bear remains plus the burial mound indicate a non-winter occupation as well. Since the bison occupied the Aspen Parkland of Manitoba only during the autumn, winter and spring and the above mentioned fauna preclude winter, then the Stott Site had to have been occupied during the spring or autumn. The mollusca were more likely to be available during low water levels in the autumn than during the spring floods.

A comparison of these two faunal samples from very different environmental zones provides insights into how a group living in the Boreal Forest can shift easily to a Plains orientation. The Woodland animals of the forested valleys, e.g., deer, beaver, bear and elk, provide a familiar resource continuum during an adjustment from the resource diffuse Boreal Forest to a seasonally resource intensive Plains adaptation. There is no sudden shift to an entirely new resource base and, therefore, no need to learn an entirely new set of hunting techniques.

The Blackduck Horizon has been identified primarily on the basis of distinctive decorative traits on thin-walled, globular vessels with flared rims; however, other traits are: small triangular notched and unnotched projectile points, end and side scrapers, awls, tubular pipes, occasional unilateral harpoon and socketed bone projectile points, bone spatulates, fleshers, small quantities of copper beads and awls, beaver incisor gouges, and burial mounds generally containing seated burials (Wilford 1955; MacNeish 1954; Evans 1961a; Wright 1965, 1967a, 1967b, 1971, 1972b; Webster 1973; Dawson 1974). The pottery has been divided into a number of types on the basis of decorative variation on the rim. Data on these categories, other than ceramics, are generally of limited value because samples have come from multi-component sites with collapsed stratigraphy and preoccupation with the ceramics has resulted in superficial descriptions of tool categories that are of limited comparative value. On the basis of lithics from the Stott and McCluskey village sites and the McKinistry mound fill, the projectiles are consistently small, triangular notched and unnotched forms with shallow rounded side-notches similar to the Plains Side-notched variants defined for the Plains (MacNeish 1954; Evans 1961a; 1961b; Dawson 1974; Kehoe 1975).

The Blackduck Horizon is not homogeneous throughout the range of distribution. This has resulted in each researcher setting up his own typological or modal analysis (MacNeish 1958; Evans 1961a; Mayer-Oakes 1970; Dawson 1974a), and/or attributing this variability to inter-areal interaction of numerous bands of a single overall ethnic group (Wright 1972: 91-105; Dawson 1974a: 89-90). In the northern and western portions of the territory Blackduck ceramics are mixed with Selkirk materials. In the southern portions they are mixed with ceramic complexes defined to the south of the Upper Great Lakes, and in the eastern portions with Huron and Petun materials.

Blackduck ceramics are found as minority elements in the Juntunen Site in

Michigan (McPherron 1967), and as part of the undefined Duck Bay Complex north and west of Lake Winnipegosis and in adjacent portions of Saskatchewan. Blackduck ceramics have strong typological affinities with some Upper Great Lakes types such as Heins Creek Cord-wrapped stick and Heins Creek Cord-stamped of Wisconsin, some Mackinac and Madison types of northern Wisconsin and Michigan, the Kathio materials of Minnesota, Larsen stamped of Iowa, and Clam River materials of Wisconsin (Wilford 1943; Mason 1966: 146; McPherron 1967: 269-275; Dawson 1974a: 89-91).

The presence of the Blackduck Horizon has been attributed to the migration of Assiniboin, Algonquian or a combination of the two (MacNeish 1954, 1958; Evans 1961a; Hlady 1970b; Wright 1967) and to a stage in the in situ evolution of Algonquian culture (Wright 1970). Given the dates, distribution, and technology, the Blackduck Horizon is identified as follows:

Hypothesis 8

> The Blackduck Horizon represents the relatively rapid movement of related groups throughout much of the Boreal Forest, Aspen Parkland of Manitoba, and adjacent edge of the Plains.
>
> The movement of peoples is hypothesized because:
>
> a) there are several technological changes from the previous Laurel Horizon:
>   i) ceramics shifted from smooth, conical, coil-made, medium-sized vessels to large, globular, vertical textile-impressed finished vessels made using a paddle and anvil or fabric mold
>   ii) decorative techniques such as dentate stamp, push and pull, and oblique incised are replaced by a variety of cord-wrapped dowel impressions; the only mode common to both horizons is a single row of punctates around the lip
>   iii) long, wide projectile points are replaced by small, triangular, shallow corner-notched or unnotched forms (Webster 1973)
>   iv) stone tubular pipes appear
>
> b) there are no sites that represent transitional developments in technology

with respect to ceramic form and manufacturing technique or projectile point morphology. There are very small numbers of sherds that have been identified as transitional on the basis of combinations of Laurel and Blackduck decorative modes (Evans 1961a; Dawson 1974a) but these can be accounted for by the temporal overlap that occurred;

c) the spread of the Blackduck Horizon was extremely rapid. The oldest dates for Minnesota and Manitoba, the western margins, cluster about A.D. 800. There is no evidence of a clinal gradient from east to west that would be expected if technological ideas shifted and people remained territorially static;

d) the Blackduck Horizon overlaps with the Laurel Horizon for at least three hundred years. Laurel sites persist as late as A.D. 1100 whereas Blackduck sites appear by A.D. 700 or 800;

e) the Blackduck Horizon coincides with an adaptive shift in resource utilization that involves groups shifting to a seasonal utilization of the Plains. If the Blackduck Horizon was merely a shift in ceramic technology, then both Laurel and Blackduck horizon subsistence activities should be the same;

f) a shift in burial practices took place from Laurel primary burials in mounds, often accumulative mounds, to Blackduck sitting burials in mounds. This comparison can not be considered as universal because secondary bundle burials and flexed primary burials occurred in mounds associated with both horizons (Wilford 1955; Evans 1961a; Kenyon 1970).

g) beginning about A.D. 800, there were considerable population shifts in the Upper Great Lakes, Upper Mississippi, Central Mississippi, and Plains. These movements are discussed later.

Current research efforts to refine the analysis of lithic materials from Laurel sites in northern Manitoba and various Blackduck sites will provide further insights into the differences that do occur and whether these differences are the result of raw materials or cultural choices.

Hypothesis 9

The Blackduck Horizon represents the material remains of several interrelated but autonomous Algonquian groups.

The previous discussion presented two alternatives for ethnic identification of Blackduck materials. The Assiniboin-Blackduck association is based on attempts to correlate distributional ranges of archaeological complexes and ethnohistoric groups. Since the Assiniboin were in southern Manitoba during the early historic period, and since only one ceramic complex was defined for Southwestern Manitoba, then the two had to be associated (Wilford 1955; Vickers 1945, 1947, 1951b; MacNeish 1954, 1958; Capes 1963). Ethnologists have recently advocated the same archaeological association without any further archaeological evidence.

> Most archaeologists agree (Wilford 1945, 1955; Vickers 1948a, 1948b; MacNeish 1958; Hlady 1964, 1970) that Blackduck sites were inhabited by the prehistoric or early historic Assiniboine. In opposition to the Blackduck-Assiniboine hypothesis are James Wright (1963, 1965, 1968b, 1968c) and Edward Evans (1961). (Bishop and Smith 1975: 55).

Bishop and Smith (1975: 56-58) present a strong case for occupation of the Boreal Forest to the west of Lake Superior by Assiniboin, thus extending the distributional correlation. The Assiniboin were listed as one of seven or eight tribes living between York Fort and Lake Superior, they were trading at Fort La Maune on Lake Nipigon, 1685-1696, they are located on a French map of 1696 in an area northwest of Lake Nipigon, Lake of the Woods was known as "Lac des Assinibouels" as early as 1681, and 150 Assiniboin were reported near Lake Nipigon as late as 1736. The authors further argue that the Dakota as well as the Assiniboin occupied much of the territory around Rainy Lake prior to the historic period.

There are two limitations to the Assiniboin-Blackduck association. These are:

a) the Blackduck Horizon is found only in the northern one-third of the State of Minnesota, whereas the Assiniboin and their Dakota relatives were distributed throughout central Minnesota;

b) on the basis of linguistic evidence, the Assiniboin broke away from the Yanktonai approximately A.D. 1600 and moved into Canada in response to an alliance with the Cree; the Blackduck Horizon spread throughout the Boreal Forest, Aspen Parkland, and nearby Plains circa A.D. 800, persisted until the latter part of the Fourteenth Century, and diminished territorially to an area north of Lake Superior.

The evidence for the Blackduck-Algonquian association is a stronger hypothesis since:

a) the distribution of Blackduck ceramics and ceramics with similar decorative motifs, surface finish, and form are confined to the Great Lakes, the southern Boreal Forest, the Aspen Parkland, and portions of the Northern Plains; the overall distribution corresponds with the distribution of northern and central Algonquians;
b) the Blackduck Horizon was distributed throughout much of this territory beginning at least A.D. 800 and possibly earlier; western Algonquian groups such as the Blackfoot, Blood, and Piegan separated from other Algonquian groups sufficiently early to develop a separate linguistic division (Goddard 1967);
c) burial patterns in Blackduck mounds are more similar to historic Algonquian groups than to Siouan groups;
d) Blackduck sites persist into the historic period near Lake Superior beyond the time that the Assiniboin occupied the area.

Few archaeologists currently working with northeastern materials would assign Blackduck materials to the Assiniboin; Wright (1972), Dawson (1974c), Syms (1974c), and Steinbring (1973: personal communication) favour an Algonquian association while Elden Johnson (1974: personal communication) believes that it is futile to assign Blackduck materials to any specific historic group. Both Dawson and Wright assign Blackduck materials to a broad Algonquian category without trying to assign them to particular historic groups.

Any effort to assign the Blackduck Horizon to a particular Algonquian group at the present time is impossible. While the Ojibwa were known to have lived north of Lake Superior prior to European arrivals, other groups such as the Cree, Gens de Terre, Tetes de Boule, and Algonkin also resided in the Boreal Forest (Warren 1970: 76-107; Bishop and Smith 1975: 56). Since the Algonquian groups lived as dispersed groups scattered throughout the Boreal Forest and shifted territories in response to resources and calamities, ethnic identity of specific bands or groups of bands was probably a fluid, changing phenomenon.

Selkirk Horizon

A second Late Woodland ceramic horizon has been identified for the Boreal Forest. This horizon overlaps geographically and temporally with the Blackduck Horizon.

On the basis of materials from Waulkinen, Alexander's Point, levels 1-4 of Lockport, level 1 of Cemetery Point and Sturgeon Falls plus the examination of surface collections, MacNeish (1958) identified the Selkirk Focus as a prehistoric and protohistoric complex, *circa* A.D. 1350 to the historic period, assigned it to the Cree and defined it primarily by its distinctive fabric-impressed sherds which he identified as the Winnipeg River Fabric-impressed ware. Sites with Selkirk components yielded larger quantities of ceramics, refuse in thin continuous layers distributed over larger areas (100 yards by 50 yards) and more numerous features such as hearths with fire-cracked rock and bell-shaped cache pits compared with sites yielding Blackduck Horizon materials. No radiocarbon dates were available. The faunal analysis was confined to the Lockport Site, levels 1-4, in which bison, moose, elk, possible deer, beaver, possible muskrat, bird, turtle, possible wolf, and fish were identified (MacNeish 1958: 175-178). The materials were quantified by numbers of bones and percentages of identifiable bones; on the basis of 680 fish bones (87% of the total number of identified bones), MacNeish interpreted a subsistence activity with a primary reliance upon fish.

Hlady (1971b) refined the Selkirk Horizon Taxonomy by identifying the regional Clearwater Punctate and Grass River Phases (hereafter referred to as complexes) for northern Manitoba, north of Lake Winnipeg, on the basis of distinctive variants of Winnipeg River Fabric-impressed materials. Within Manitoba, Clearwater Lake is the predominant complex in the Southern Indian Lake Region (Hanna 1974; Wright 1968; Dickson 1972, 1975a; Wiersum 1972; Wiersum and Riddle 1971; Kelly 1974). Hlady (1971b: 62) found Clearwater Lake Complex ceramics at 17 of the 26 sites reported in his survey of various sections of northern lakes and streams; ceramics from these sites were often the majority or only ware identified. To the west, along portions of the Churchill River in Saskatchewan, Meyer (1975) identified Clearwater Lake Punctate pottery from 54 of the 64 sites recorded during the survey.

Farther south, in the area around the north end of Lake Winnipeg, Mayer-Oakes (1970: 11-54) found that 10 of the 39 sites recorded during the survey of the Grand Rapids Reservoir contained Clearwater Lake materials and that it was the predominate material at four of the sites. Hlady (1971b: 30-37) identified three additional sites in the Saskatchewan River Region, in which Clearwater Lake materials were predominant.

The Grass River Complex was identified on the basis of distinctive surface finish which has a wicker-basket appearance (Hlady 1971a: 118-120; 1971b: 28-29). Sites containing Grass River Punctate sherds were less common, e.g., at 4 of the 26 sites in Hlady's survey, none of Mayer-Oakes sites, infrequent in the Southern Indian Lake Region, and rare in Meyers' survey of the Upper Churchill in Saskatchewan. Hlady (1971a, 1971b) believes that the Grass River Complex may be the material remains of the Swampy Cree or, less likely, the Chipewyan. Recent research on Southern Indian Lake indicates that Grass River Punctate pottery is found in small quantities at a number of sites which contain Clearwater Lake Punctate ceramics.

The Clearwater Lake Complex, and possibly the Grass River Complex, represent a northern regional expression of the Selkirk Horizon. It is confined to an area of northern Manitoba, Saskatchewan, and possibly adjacent Ontario (Figure 20). Known sites are confined primarily to the Saskatchewan and Churchill river systems.

In addition to these, there is residual category of the Selkirk Horizon which has no diagnostic definition except the presence of Winnipeg River Fabric-impressed ware. It has been reported from the Winnipeg River and Red River (MacNeish 1958), The Pas Site on the Saskatchewan River (Tamplin 1973) and from components in western Ontario in context with other ceramics, e.g., the Hungry Hall and Pic River (Stratum I) sites (Wright 1967b). Reconstructed vessels from The Pas Site are different in shape and surface finish from other Selkirk ceramics, the analysis of The Pas materials has not been completed and the Ontario sites are represented by minute samples. MacNeish's materials have already been discussed.

Temporally, the Selkirk Horizon dates from at least the beginning of the Thirteenth Century and terminates in the historic period (Table 8). Two dates of A.D. 760± 70 (Gak-1260) and A.D. 1190± 80 (Gak-1259) are rejected by Wright (1971) because they come from the same occupations as samples dated later by Isotopes Incorporated. The only other early date is A.D. 940± 95 (S-966) from SIL 54 on Southern Indian Lake. The terminal date is the latter part of the Eighteenth Century or early Nineteenth Century. A. Kehoe (1964) is certain that her François variety vessels of Wascana ware, which are Clearwater Lake Punctate vessels, were found on the floor level, and within the structure, of the François Le Blanc Trading Post, near Nipawin on the Saskatchewan River. Meyer (1975: 129) considers his sample from the Stump Bottom Site on the Upper Churchill River of Saskatchewan to be undisturbed. The Pic River Site, Stratum I also had Selkirk

TABLE 8

SELKIRK HORIZON DATES

Political Unit	Site	Date (B.P.)	Carbon-14[a] Date	References
A. Selkirk Horizon (general)				
Manitoba	The Pas Site,Layer 1A	525±150(A-1293)	A.D.1425±150	Tamplin 1973:4
	The Pas Site,Layer 1A	560±45(A-1324)	A.D.1390±45	Tamplin 1973:4
	LAS 406, Layer A	490±110(A-1196)	A.D.1460±110	Tamplin 1973:4
Ontario	Hungry Hall Site[b]	745±60(S-109)	A.D.1202±60	Wright 1967b:90
	Pic River Site Stratum I[b]		A.D.1700-1750 (estimate)[c]	Wright 1967b:61
B. Clearwater Lake Phase				
Manitoba	SIL 257	460±100(S-781)	A.D.1490±100	Hanna 1974
	Neck Site Stratum I	760±80[d] (Gak-1259)	A.D.1190±80	Wright 1971:10
	Neck Site Stratum I	435±110(I-2078)	A.D.1515±110	Wright 1971:10
	Neck Site Stratum II	1190±70[d] (Gak-1260)	A.D.760±70	Wright 1971:10
	Neck Site Stratum II	730±150(I-2081)	A.D.1220±150	Wright 1971:10
	Neck Site Stratum II	705±320(I-2082)	A.D.1245±320	Wright 1971:10
	MacBride Site	360±100(Gak-1267)	A.D.1590±100	Wright 1971:3
		- (Gak-1255)	Post A.D.1800	Wright 1971:3
	UNR 23	475±165(S-745)	A.D.1485±165	Weirsum and Tisdale 1974
	SIL 54	1010±95(S-966)	A.D.940±95	Rutherford 1975a
	SIL 54	85±50(S-968)[e]	A.D.1865±50	Rutherford 1975a
	SIL 54	240± 65(S-1078)	A.D.1710± 65	Rutherford 1976
	UNR 48	490± 85(S-1080)	A.D.1460± 85	Rutherford 1976
	UNR 48	465± 65(S-1076)	A.D. 1485± 65	Rutherford 1976
	SIL 184/1	300±170(S-965)	A.D.1650±170	Rutherford 1975b
Saskatchewan	Stump Bottom Site	- (?)	Post A.D.1750[f]	Meyer 1975:129
	Francois Le Blanc Trading Post	-	A.D.1768-1774[g]	Kehoe,A. 1964: 18-21

[a] Direct conversion to chronological date.

[b] Mixture of Blackduck and Selkirk materials.

[c] Estimate based upon presence of French fur trade items.

[d] Gakushuin (Gak) and Isotopes (I) dates come from same layer; Wright favours the Isotopes dates.

[e] Dickson (1975: personal communication) attributes this late date due to mixing of modern moss with the bone.

[f] Based on a carbon-14 sample from a test square.

[g] Ceramics are believed to have been associated with the floor level of the fort (Kehoe, A. 1964: 18-19).

pottery in association with French fur trade items. On the basis of the limited sample of dates from Saskatchewan, Selkirk materials appear to be confined to the historic period.

Selkirk materials have, without exception, been identified with the Cree (MacNeish 1958; Hlady 1970a, 1970b, 1971b; Mayer-Oakes 1970; Wright 1971; Meyer 1974). While there are no ethnohistoric accounts of the Cree making pottery, the site distribution corresponds with the known distribution of the Cree during the early historic period, the dates indicate that Selkirk pottery persists into the historic period, and historic trade items are frequently found in association with Selkirk pottery.

The term, Cree, is not used here in the narrow sense of the identities that emerged as a result of groups settling into the localized resource utilization associated with the fur trade of the Nineteenth Century. The term is used to include a variety of small, independent bands of Algonquian speakers who occupied northern Saskatchewan, northern and eastern Manitoba, northern Ontario, and northwestern Quebec (Wright 1971: 21).

Archaeological data have revealed little concrete evidence regarding resource utilization. Most Selkirk sites have yielded few faunal remains and little evidence of stratigraphy. Large sites of up to 35 acres have been recorded but these are multiple occupation sites (Dickson 1972, 1975a; Kelly 1974). The size of the sites may be due, in part, to the habit of early historic groups to coalesce in the spring (Ray 1974: 43-46).

Middle Mississippi Area

It is necessary to also examine developments in the Middle Mississippi Valley during the Late Woodland Period, as these developments influenced other areas such as the Upper Great Lakes, the Upper Mississippi and the Eastern Plains. Both the Late Woodland Jersey Bluff and the Mississippian Pattern developed here, but the impact of Mississippian developments on surrounding areas in terms of new horticultural techniques, centralized political organization, population growth, trade, and technological innovation are particularly important. These new developments spread in various attenuated forms into the Upper Great Lakes, Upper Mississippi and Plains areas.

The Mississippian Pattern emerged along the southern Mississippi River valley approximately 500-600 A.D. (Jennings 1974: 246). By A.D. 700-900, the Mississippian Pattern had shifted north, up the American Bottoms of the Mississippi River to the Middle Mississippi; this core area includes the Mississippi from approximately East St. Louis to Vicksburg (Griffin 1967; Smith 1973). This pattern persisted until the early historic period but only in an attenuated form in the Middle Mississippi area after the "collapse" of such centres as Cahokia and Aztalan *circa* A.D. 1300.

The Mississippian Pattern is difficult to summarize briefly since it represents 800 years of growth, expansion and subsequent decline. Noteworthy characteristics, however, were:

a) the presence of large centres, such as Cahokia, with flat-topped pyramid mounds and burial mounds;
b) status differentiation as reflected in exotic burial goods;
c) centralized authority directing labour;
d) intensive horticulture emphasizing corn, beans and squash plus

technological items such as stone hoes in large numbers;

- e) ceramics
  - i) with a variety of new forms such as ollas, bean pots, pans and bowls
  - ii) with a variety of new decorative items such as handles and appendages
  - iii) with decorative techniques such as incising, particularly in curvilinear and spiralling patterns, punctates, engraving, red-filming and negative painting
  - iv) crushed shell becoming the universal temper
  - v) surface finish being smoothed, and distinctive technological differences emerging between utilitarian and socio-ceremonial vessels;
- f) extensive trade networks for importing a variety of shells, such as conch, copper, mica and specific lithic materials;
- g) Southern Cult religious motifs and items;
- h) small projectile points of which small, triangular concave-based forms were very common but side-notched and tri-notched forms existed as well (Willey 1966: 292-306; Griffin 1967: 189-190; Jennings 1974: 246-265; Fowler and Hall 1972).

Horticultural efficiency has been considered of prime importance in the development of Middle Mississippian settlements (Griffin 1967), but Smith (1973: 3-6) argues that this emphasis has over-shadowed the importance of animal exploitation and that the nature and treatment of much of the data on faunal exploitation has made it difficult to make even rough estimates of the relative importance of domestic cultigens versus faunal resources.

Mississippian influences can be seen in the rise of a Plains Village Tradition along the Missouri River and some of its tributaries, as well as in the development of a number of traditions in the Prairie Peninsula and nearby areas. According to Gibbon:

> The greatest degree of cultural diversity and the largest number of settled, defended villages known in the prehistoric period occur in northern and western hinterland zones between A.D. 1050 and A.D. 1300. Although there is only minimal evidence of contact between many village clusters, most seem to have participated to some extent in a common network focused on the Mississippi heartland in the American Bottoms. Some, such as the

> Woodland-based Great Oasis and Camria peoples, probably served as intermediaries of middlemen between hinterland nodes in the Mississippian exchange network and more distant groups . . . . Cambria ceramics, for instance, stretch along the Minnesota River, which perhaps connected the Middle Missouri Tradition components with Mississippian nodes situated at Red Wing-Diamond Bluff . . . . Nearly all of these hinterland peoples also adopted some Mississippian Stylistic concepts and finished goods. (Gibbon 1974: 135).

Discussion of the possible influences of Middle Mississipian developments on the Plains Village, Woodland Oneota and Effigy Mound groups requires a general understanding of Middle Mississippian chronology. Based upon research at Cahokia, a series of stages have been identified (Fowler and Hall 1972):

A. Patrick Phase (Pre-A.D. 600-800). This is a pre-Mississippian Late Woodland occupation. It is represented by a ceramic complex which includes relatively straight-walled vessels with vertical fabric impressions and interior lip notching.

B. Unnamed Phase (A.D. 800-900). There may be a transitional phase between the Woodland and Mississippian phases but evidence is inadequate.

C. Fairmount Phase (A.D. 900-1050). A phase of considerable construction activity, evidence of an elite class, increasing importance of shell temper, predominance of smooth surface finish, some of which has red-filming, and a variety of specialized ceramic vessels.

D. Stirling Phase (A.D. 1050-1150). This phase corresponds to materials that have been referred to as "Old Village". It represents a period of considerable expansion which probably accounts for the development of Aztalan in southern Wisconsin. The main construction phases at much of the Cahokia site were completed. Evidence of Southern Cult is seen in the appearance of the "weeping eye" motif.

E. Moorehead Phase (A.D. 1150-1250). This is the equivalent of Griffin's Cahokia Climax or "Trappist" period. The basic settlement of the site was completed.

F. Sand Prairie Phase (A.D. 1250-1500). Final evidence of mantles on some mounds, scattered debris over much of the site, and shift of ceremonial plaza to residential use.

The developments at Middle Mississippian centres such as Cahokia influenced surrounding areas in terms of:

a) the introduction of technological changes, e.g., new techniques for making pottery;
b) new subsistence emphasis, e.g., the introduction of techniques for increasing horticultural activities plus new strains of cultigens;
c) new forms of social integration through
    i) redistribution, e.g., market place
    ii) social integration, e.g., tribal councils
    iii) trade networks, e.g., adoption of fictive kinship relationships.

Gibbon (1974) postulates that a state level of organization for Middle Mississippian developments was attained by the end of the Fairmount Phase, circa A.D. 1050. Its development had begun by A.D. 900, and perhaps by A.D. 800. During the subsequent Stirling Phase (A.D. 1050-1150) this state, referred to as the Ramey State, included a six-mile-square centre at Cahokia, incorporating a population of between ca. 20,000 and ca. 38,000 people with areas of craftsmen specialization and satellite communities such as the Mitchell Site, Illinois (Porter 1969; Gibbon 1974). Gibbon, in an effort to encourage researchers to think in terms of networks and wide-spread influences rather than site locality chronologies, postulated the following ten propositions:

1. Cahokia was the focus of a complex social organization having a state-level of integration.
2. The process involved in the development and decline of Cahokia and Teotihuacan seems sufficiently similar to consider both as examples of the same cross-cultural ideal-type, i.e. a theocratic or ceremonial state.
3. Although a secondary state, the Ramey State developed independently as the product of correlative demographic, environmental, and social variables.
4. The Ramey symbiotic-extractive exchange network developed to its fullest extent after a state-level of organization was attained in the core zone.
5. The widespread appearance of settled villages displaying differential adoption of Mississippian traits between A.D. 1100 and A.D. 1300 in the Prairie Peninsula and northern deciduous forest zone is directly related to the expansion of the Ramey exchange network.
6. The Ramey exchange network was extractive and operated under the umbrella of magico-religious sanctions and guarantees.
7. Mississippian centres in the hinterland zone--in particular the Red Wing-Diamond Bluff area, Aztalan, and the Apple Creek Focus--were inhabited by a predominantly hinterland population, although Cahokians may have been instrumental in their administration.
8. The collapse of the Ramey State and its symbiotic-extractive exchange network was primarily a result of a flaw in internal social organization, although hypothesized climatic change to the west and north was probably a significant exacerbating factor.
9. Major demographic, stylistic, and organizational changes apparent in the hinterland zone by about A.D. 1300 are directly related to the collapse of the Ramey State, with climatic change again probably a significant factor.
10. A period of "Balkanization" and decline in the level of integration occurred around the peripheries of the core zone as multiple centers, most of which were initially contemporary with at least the latter phase of the Ramey State, and new exchange networks emerged. (Gibbon 1974: 136).

The emergence of the Mississippian Pattern in the Middle Mississippi affected developments in nearby areas. The new technology, horticultural practices, redistribution systems and sedentary settlements spread to other areas. The distribution of groups changed as migration, positive and negative interactions, and new forms of resource adaptation changed the relationships between groups and their environment and the relationships with each other.

Upper Mississippi Area

This area includes southern and central Minnesota, Iowa, northern Missouri, western and northern Illinois and western Wisconsin. The Late Woodland Period developments reflect local Woodland developments, intrusive Mississippian settlements such as Aztalan, and blends of these two major developments.

Oneota Composite.

The Oneota Composite has been found in southern Michigan, central Wisconsin, southern Minnesota, Iowa, eastern South Dakota and Nebraska, and Missouri (Wedel 1961: 117-121; Willey 1966: 310; Gibbon 1972, 1973; Gradwohl 1974). It has been characterized as follows:

> Its ceramics were shell-tempered, typically globular olla-shapes with strap handles, and ornamented with simple geometric incised designs below the rim. One of the most characteristic traits was a small, short-stemmed disk pipe of stone, sometimes called the "Siouan pipe". Cemetery burial was practised, and there are no burial or platform mounds at the sites. Located on the western edge of the central and northern Woodlands area, Oneota was a transitional culture, between Woodlands and Plains. House types, for example, were apparently pole structures in the east but earth lodges in the Nebraska Low Plains. Its late phases have been identified with several historic Siouan tribes of both the Woodlands and the eastern edge of Plains: the Winnebago, the Oto, the Ioway, the Missouri and the Osage. (Willey 1966: 310-311).

These latter groups are combined with the linguistic Chiwere-Winnebago Sioux group (McKusick 1971: 87).

For the western Oneota settlements on the Central Plains, Wedel (1961: 118) has postulated that sites, such as Leary, consisted of villages of prolonged occupation in which a few earth lodges were present but the less substantial wigwam structures were more prevalent. Subsistence was based in part on corn, beans and other crops, but hunting, collecting and fishing were important. Deer, bear and other marginal Woodland animals were more important than the bison. More easterly sites, such as those in Wisconsin reflected a variety of economic activities through time, with little evidence of domesticated plants (Hurley 1974). In Minnesota, the Oneota, represented by the Moingona Phase in the Des Moines River Valley, was characterized by the hunting of deer, elk, bison (in lesser quantities), canids, raccoon, beaver, small animals, fish, turtles, mussels, waterfowl, small birds, the collection of fruit and nuts and the growing of corn, beans and squash (Gradwohl 1974: 95-96). Oneota sites reflect the importance of a diffuse resource base throughout the area with an increased emphasis upon bison on the Central Plains. The Minnesota sites reflect an emphasis upon both Plains and Woodland animals.

Two Oneota burial mounds were found along the Red River (Wilford and Johnson 1970). However, they are much more common in southeastern Minnesota (Wilford and Brink 1974). The Red River mounds were identified by the presence of shell-tempered Oneota pottery and stone cairns and estimated to date circa A.D. 1600. Sites like Hogback are early historic and are estimated to represent early Iowa of the latter half of the 1600's, as indicated by the historic items (Wilford and Brink 1974: 67-68).

Several sites in the Upper Mississippi Area show that Oneota structures included oval-ended longhouses ranging from 8 to 14 feet wide and 20 to 55 feet long to 24 to 30 feet wide and 60 to 90 feet long (McKusick 1973, 1974). The Chiwere and Dhegiha Siouan tribes and the Santee built large longhouses, primarily as summer residences, that were made by covering a pole frame with bark or rush mats; the groups shifted to smaller ovoid wigwams during the winter. There is no evidence that any of the sites was fortified.

The appearance of sites with large structures, some of which may have held as many as 200 people required the development of social mechanisms to organize the changing patterns of social interaction. The historic accounts reveal the residence rules in these houses were based upon kinship along clan lines (McKusick 1974: 200, 208); the appearance of sites with clusters of these structures imply the emergence of such kinship units by 1000 A.D.

No ancestor for Oneota has been found. Gibbon (1972: 167-174) suggested that Oneota in Wisconsin developed from Effigy Mound materials circa A.D. 900-1000 when Mississippian horticultural practices and social integrative patterns developed in the Middle Mississippi area. Hurley (1974), however, refutes this argument because evidence of horticultural activities in Oneota sites is insignificant, initial Oneota sites co-exist with Effigy Mound sites with little modification to the Effigy Mound sites, and the diffuse subsistence patterns and resources preclude any need for plant domestication.

A series of Oneota developmental stages have been defined (Gibbon 1972: 169-179). During A.D. 900-1300, Oneota settlements were large villages. For the period A.D. 1300-1650, the development of settlement factionalization is proposed. Settlement distribution denotes a shift from Lake-Woodland areas of Wisconsin to the Prairie Peninsula, possibly in response to increasing grassland developments during the proposed Pacific Climatic Episode of this time.

Effigy Mound Tradition

In addition to the Oneota Composite, the Effigy Mound Tradition, with its most intensive expression in Wisconsin, developed in the Upper Mississippi Area. Hurley assigned a time span of A.D. 300-1642 to the Effigy Mound Tradition with its core of diagnostic items such as:

> . . . cord- and fabric-impressed pottery, recognizable through time and space and found in mounds of effigy and non-effigy shape and in camp, work, rock shelter, cave, village, and mound sites. The hunter-gatherer-fisher economy was part of a relatively simple life-style which was not unduly affected or modified by contacts with Middle Woodland, Middle Mississippian, or Oneota peoples (Hurley 1974: 116).

Within the northwestern portion of the Upper Mississippi Area, there are Effigy Mound sites, Oneota sites, and Mississippian sites such as Aztalan. The Effigy Mound Tradition is an indigenous development; many ceramic types found in the Madison Ware that characterize this tradition include a predominance of fabric surface finish as well as a variety of decorative techniques such as cord-impressing, finger pinching, incising, and punctating (Hurley 1974: 117-121). There is a paucity of information on structures and village format.

Cambria Complex

The Cambria Complex is known primarily from the Cambria Site (Wilford 1955; Knudson 1967; Watrall 1968, 1974). Culturally and geographically it is intermediate between Middle Mississippian intrusion into the Upper Mississippi Area and the Initial Middle Missouri Variant of South Dakota (Watrall 1974: 138). There are no dates from the site but it has been estimated to date circa A.D. 1000-1300. Cambria burials have been found in the region of the headwaters of the Red River and Minnesota River (Wilford and Johnson 1970).

The Cambria materials reflect the interaction that was taking place along the boundary of the Plains and adjacent zones to the east. While the Cambria ceramics were basically Plains ceramics, contemporary and similar to the Initial Middle Missouri materials to the West, they also incorporated strong Mississippian influences in certain traits such as broad trailed shoulder designs, polished finish, loop handles, rolled rims, and the lineate-chevron ("sunrise") motif, plus certain Woodland traits such as punctates applied in a triangular motif (Knudson 1967: 278-279). Johnson (1969b: 275) sees no overlap or continuity between Cambria and Great Oasis materials. Watrall (1974) has discussed the resource utilization reflected by the non-ceramic refuse materials from the Cambria type site. Raw materials included local lithic materials plus several imports such as oolitic and nonoolitic chert, obsidian, brown chalcedony, and copper (Watrall 1974: 140). The presence of non-local raw materials and ceramics with traits representing interaction with groups to the west, south, and southeast substantiates the argument that there were diverse regional contacts.

The people had exploited a wide variety of animals and habitats. White-tailed deer were most numerous, followed by carnivores, and in small numbers, bison, elk, beaver, mink, badger, skunk, raccoon, otter, weasel, muskrat, woodchuck, shrew, bird, fish, and turtle remains. Corn was also found. The Cambria village peoples have been classified as having a semi-diffuse exploitation in which they utilized a variety of resources but placed an emphasis upon certain species such as deer (Watrall 1974: 141-142).

Mill Creek Complex

Mill Creek Complex is an expression of the Initial Middle Missouri Variant in western Iowa which lasted from approximately A.D. 900-1400 (Anderson 1969;

Baerreis and Alex 1974: 143). The Mill Creek Complex represents a series of sedentary villages with rectangular semi-subterranean lodges along the rivers. A study of changing pollen and faunal frequencies, particularly deer and bison, show that there was a general tendency for bison to replace deer with a sharp increase in bison *circa* A.D. 1200. The faunal shift correlates with the increased aridity and Plains expansion of the Pacific Climatic Episode (Frankforter 1969; James and Nichols 1969). Semken (1971) argues, however, that the study of small mammals from Mill Creek sites, such as Wittrock, imply that the climate during the Fifteenth Century was analogous to the modern climate.

Mill Creek origins have been interpreted as the result of Mississippian migrations, *in situ* development with strong Mississippian influences, or as a local development representing influences from various directions including Middle Mississippian centres; the latter hypothesis is becoming most prominent because the early components do not demonstrate a high frequency of Mississippian elements (Anderson 1969: 141; Zimmerman 1971: 119).

Mill Creek dates span the period A.D. 810 to A.D. 1580 but some authors believe the period A.D. 900 to A.D. 1400 is more realistic (Anderson 1969: 138). After A.D. 1400 or 1500, the Mill Creek Complex disappears and the people are believed to have moved up the Missouri River (Anderson 1969: 141).

Great Oasis Tradition

The Great Oasis Tradition data have been synthesized recently by Henning (1971). Like the Cambria Complex, the Great Oasis materials are considered to have developed from a Woodland base. They appeared no later than A.D. 900

and persisted until at least A.D. 1300 (Henning 1971: 130). Sites appear primarily in southwestern Minnesota, northwestern Iowa, and along the Missouri River in Northeastern Nebraska and southeastern South Dakota.

Great Oasis materials are frequently found with Woodland vessels. Johnston (1967) noted that nine or ten of the ten sites along the Missouri River containing Great Oasis materials also contained pottery of the Orlean Composite; this association may reflect an early transitional development or close association.

The relationship between Great Oasis and Mill Creek can be tentatively inferred. The two may be either "genetically" related or Great Oasis may have developed its own "cultural identity" and subsequently influenced Mill Creek developments (Henning 1971: 126-127). Decorative techniques of pottery are remarkably similar but rim profiles and lip shape are dissimilar.

Houses were rectangular semi-subterranean structures with numerous pits. No stockades are recorded. Although evidence is limited, subsistence appears to have been based primarily upon corn, fish, birds, deer; bison are rare (Henning 1971: 128).

A number of Late Woodland complexes in Minnesota have been defined solely or primarily upon the basis of mound excavations. The definitions of these complexes are incomplete because they represent one segment of the activities and tool kits of the societies that were responsible for their manufacture. They can, however, provide important data on distribution, time, part of the resource utilization, and evidence of biological identification along ethnic lines. Much of the data is based upon the work of Lloyd Wilford over several decades which is only now being analysed and published.

Arvilla Burial Complex

The Arvilla Burial Complex consists of a series of linear and circular mounds with subsurface pits (Johnson 1973). Associated artifacts include:

a) side- and corner-notched projectiles, bifaces, abraders, grooved mauls of stone;
b) bone bracelets, awls, spatulas, unilateral barbed harpoons, beads, numerous antler hafts with and without accompanying beaver incisors;
c) eagle talons;
d) bear canines;
e) elk incisors;
f) shell pendants and gorgets;
g) a variety of beads from columella, Nautica shells, dentalium;
h) shells carved into tubular or flat, washer forms;
i) unique pottery pipes;
j) breast plates, awls, and knives of copper in minor frequencies.

The associated grave goods are dominated by bone and shell and although not all elements are found in all mounds, the recurrent clusters of traits are distinctive (Johnson 1973: 62). Mortuary vessels are not numerous. They are represented by St. Croix Stamped, Blackduck and Kathio vessels. The distribution in Minnesota is confined primarily to the Red River and its tributaries and the south-central portion of the state. Other mounds such as the Arvilla type site and the De Spiegler Mounds are on the North and South Dakota sides of the Red River. Since the Red River flows into Manitoba, it is not surprising that Johnson would find Manitoba mounds that have similar traits. On the basis of Capes' (1963) descriptions, Johnson (1973: 65) includes Calf Mountain, Sims, and Star Mounds from the Pembina Valley, Fidler Mounds from the Red River Valley north of Winnipeg, and the Lone Mound along the Assiniboine River within the Arvilla Burial Complex. Other Manitoba mounds that share a number of Arvilla traits, e.g., notched shell pendants, shell gorgets, and seashell beads, are the Sykes and McKay Mounds along the Pembina Valley (Vickers 1945: 91) and the Westbourne Mound (Montgomery 1908: 38, Plate V).

Temporal estimates of the Arvilla Burial Complex are hampered by limited data. Four dates have been obtained on Minnesota mounds and only two are considered reliable (Johnson 1973: 66). Dates of A.D. 600 (I-779) and A.D. 785± 120 (I-778) on bone are accepted but a date of A.D. 1280 (I-792) on bark and 1250± 190 B.C. (I-780) on shell from the same mounds are rejected. On the basis of these two dates plus stratigraphic evidence, Johnson (1973: 66) assigns a range of A.D. 500 or 600 to A.D. 900 for the Arvilla Burial Complex.

Kathio Burial Complex

A second burial complex is represented by four mounds in the Kathio Burial Complex (Wilford et al 1969; Wilford and Johnson 1970). These consisted of secondary or bundle burials on the original ground level, generally accompanied by sherds with cord-wrapped dowel impressions. One date of A.D. 927± 100 (I-791) has been obtained from Kathio burials (Streiff 1972: 34). Kathio and the closely related or identical Clam River foci follow or overlap temporally with the Arvilla Burial Complex (Johnson 1973: 66). The Kathio materials are currently being re-assessed.

Developments in the Upper Mississippi Area

The Upper Mississippi Area developments during the Late Woodland Stage are characterized by the appearance of new archaeological units, new subsistence-settlement orientations, new forms of social organization, and new technological traits. There are seven new archaeological manifestations: Oneota Complex, Effigy Mound Tradition, Cambria Complex, Mill Creek Complex, Great Oasis Complex, Arvilla Burial Complex, and Kathio Burial Complex. There is no agreement among the specialists involved with these taxonomic units regarding progenitors or exact interrelationships so this issue can not be resolved at present. However, important insights can be derived into the developments in subsistence-settlement activities, social organization, forms of interaction, and technological developments.

a) Greater numbers of archaeological taxa existed during the Late Woodland than during the Middle Woodland Stage. In an area in which only Hopewellian and Malmo sites were reported during the Middle Woodland Stage, seven new archaeological units are defined.

b) Sedentary villages, based on both horticulture and diffuse faunal resources replaced Hopewellian centres and sites of small, nomadic groups. Both Mill Creek and Oneota sites contained long houses which have been interpreted as clan residential units (McKusick 1973, 1974). Horticulture, primarily beans, corn, and squash, was important for Mill Creek, Oneota, Cambria, and Great Oasis sites (Wedel 1961: 118; Gradwohl 1974: 95-96; Watrall 1974; Henning 1971: 128). Hunting of a variety of animals provided an important part of the diet. The importance of seasonal bison hunts on the Plains cannot be determined because research has been on a regional basis rather than directed toward an understanding of the total seasonal round of particular complexes.

c) The crystallization of populations into a variety of ethnic groups was an important process. The increased number of archaeological taxa with distinctive clusters of assemblages, the presence of fortifications at some Mill Creek sites, the relatively small geographical range covered by most taxa provide a marked contrast to the broad borizons of the Boreal Forest during the same time period. The Oneota Composite has a broad distributional range but it is unclear whether this represents numerous migratory groups or gradual redistribution through time. The Cambria and Mill Creek complexes are confined to small areas.

d) There is some evidence of mobility. The Mill Creek Complex disappeared from northwestern Iowa circa A.D. 1400, and the Oneota Complex shifted from the Lake-Woodlands of Wisconsin to the Prairie Peninsula (Gibbon 1972: 169-179; Anderson 1969: 141). In both cases, actual migration of people is proposed.

e) New technological traits appeared

    i) spread of Mississippian ceramic traits such as shell tempering, simple geometric decorative designs applied as incised or broad trailed lines, rolled rims, lineate-chevron designs, loop and strap handles, and polished surface finish

    ii) construction of long houses
    iii) tools such as horn picks and scapula hoes for horticulture

f) Subsistence activities shifted from the previous relative isolation of Plains and Woodland activities to an emphasis upon utilization of both biomes. The Oneota Composite, Cambria Complex, and Great Oasis Complex represented populations utilizing both Plains and Eastern Woodland biomes (Willey 1966; Johnson 1969b; Knudson 1967; Gibbon 1972).

g) Trade networks were important. Both raw materials and ideas were redistributed throughout the populations. Many of the new traits such as the use of spiral broad-trailled designs were found in the ceramics of many of the groups of the Upper Mississippi Area. The spread of this design is in marked contrast to the spread of new complexes. These differences are indicative of some of the variables that are important in assessing whether the process of diffusion or migration is important. The differences are:

    i) the spiral design is a trait that is distributed independently of other ceramic traits such as form or surface finish
    ii) the spiral design has been found on isolated vessels on the Northeastern Plains that lack the technological skill in manufacturing in Mississippian sites (Syms n.d.b)
    iii) Mississippian traits often appear in a complex after it is already established and then gradually increase through time (Anderson 1969; Zimmerman 1971: 119)

Hypothesis 10

During the Late Woodland Stage in the Upper Mississippi Area, a series of archaeological complexes appeared which represented co-existing sedentary or semi-sedentary groups who shifted territories periodically.

The presence of the sedentary or semi-sedentary groups is important for Southwestern Manitoba. The villages provided potential trade centres, sources of horticultural produce for nomadic hunters, and centres for the diffusion of particular ideas such as ceramic decoration. An isolated vessel from the Brockinton Site has "Mississippian" traits such as spiral broad trailled design, dense paste, and smooth surface finish, but lacks the technological skill in symmetry and smoothness of surface that is characteristic of Mississippian vessels.

The limited data on the Arvilla Burial Complex suggests that groups actually migrated down the Red River into southern Manitoba. Since at least one group followed this route and since a number of groups appeared, then evidence of other migrations, such as the eventual movement of Mill Creek peoples, must be considered as potential inhabitants of Southwestern Manitoba.

Upper Great Lakes Area

In his recent synthesis of Michigan and the Upper Great Lakes, Fitting (1970: 143-191) attributes developments to an agricultural base or a strong dependence upon agricultural produce through trade. Corn, beans and squash were common in sites by A.D. 800-1000. He objects to statements that Late Woodland was a form of Hopewellian deterioration or de-evolution; rather, he sees Late Woodland as being an efficient, dynamic subsistence adaptation.

The Late Woodland Stage is also characterized by numerous regionally defined foci or complexes based primarily on ceramic decoration or the variety of burial goods. Some of this regionalization is, undoubtedly, an artificial construct due to definition of chronological sequences on the basis of excavations at a few sites. A detailed comparison of all these regional manifestations is possible only at a superficial level because few reports provide adequate quantitative data, artifact descriptions, or illustrations.

These numerous regional "complex, foci, phases or cultures" around the Upper Great Lakes include, at a very general level:

a) ceramic traits such as thin walled globular vessels with fabric surface finish, a variety of cord-impressed, cord-wrapped object impressed and/or punctate impressions, e.g., Wayne Ware (Fitting 1965, 1970), Mackinac Ware (McPherron 1967a), Lakes Phase pottery (Salzer 1974) and Madison Ware (Hurley 1974; Mason 1966);
b) a predominance of side-notched and unnotched triangular projectile points;

c) a relative scarcity of copper except as beads or occasional utilitarian tools as awls or fish hooks.

Many sites also contain collared or castillated sherds, the latter being common further to the east, and evidence of smooth, and often shell-tempered, pottery that is identified as Ramey, Oneota, or Upper Mississippian.

Developments to the south of the Great Lakes is best known from research in Michigan. Not only have there been many excavations of varying quality for four decades, but numerous sites have had large areas excavated (e.g., 4100 square feet at Moccasin Bluff, 4750 square feet at Juntunen), and researchers like Cleland (1966, 1968, 1971) and Yarnell (1964) have analyzed the faunal and floral remains from many sites. The large samples of artifacts and accompanying faunal remains have been interpreted using a model of seasonal subsistence rounds of historic groups and reconstructing prehistoric rounds on the basis of site location, faunal and floral remains, and frequency variation of functional tool types (Fitting 1970).

The earliest evidence of Late Woodland materials in Michigan is approximately A.D. 700, but it did not become fully established until A.D. 800-1000 (Fitting 1970: 145, 148). The Late Woodland is characterized by globular cord-marked vessels, such as the Mackinac and Wayne wares, corner-notched projectiles, gorgets, celts, copper ornaments, and corn agriculture, increased population density (expressed in larger and more numerous sites), and the development of regional symbiosis as items and goods were being exchanged across biomes (Fitting 1970: 145-148, 232).

The Michigan record shows that during the Neo-Atlantic Period, the settlements were most intensive and the Mississippian and Oneota were most extensive. Influences also appeared from the north as the early Iroquoian Glen Meyer Complex from southwestern Ontario influenced the Wayne Ware of southeastern Michigan A.D. 900-1100 (Fitting 1970: 150). Long houses 25-30 feet wide and 40-585 feet long occurred at some sites while other sites consisted of palisaded villages of small circular or oval structures. Sites in the northern part of the state contained Blackduck pottery mixed with the local wares.

Resource utilization was highly variable. In the southern and eastern areas, deer was most important, followed by small mammals and fish. In the extreme north, such as Isle Royale, northern animals such as beaver, moose, caribou, sturgeon, and lynx were important.

Much of southern, eastern and northern Michigan appears to have been abandoned from about A.D. 1400 until the historic period. Parts of southeastern Michigan were utilized only seasonally even in the historic period. The florescence of settlement during the Neo-Atlantic Climatic Episode is attributed to climatic amelioration which enabled horticulture to expand northward, and to the need for exchange networks between the horticulturalists and the nomads to the north (Fitting 1970: 236).

Neighbouring Wisconsin had sufficiently different resources that a different cultural history developed. Salzer's (1974) work in northern Wisconsin implied a shift from sites of the Early and Middle Woodland Nokomis Phase located in riparian environments along streams and at outlets of lakes to a Late Woodland Lakes Phase lacustrine pattern in which eastern lakeshores, lakeshores near outlets, peninsulas and islands were preferred. The latter locations were in wild rice areas.

Salzer also observed a shift from primarily exotic foreign materials of the Middle Woodland to the utilization of local quartz during the Late Woodland. Late Woodland sites were larger and yielded greater quantities of debris. Ceramics included minor elements of southern Wisconsin Madison Ware, northern Michigan Mackinac Ware, Aztalan collared types, usually undecorated Oneota vessels, and some Mississippian types (Salzer 1974: 49). About A.D. 1400, the area was abandoned and remained so until the historic period (Salzer 1974: 50).

In northwestern Wisconsin and the adjacent Mille Lacs Region of Minnesota, Clam River ceramics have been recorded (Caine 1974; Johnson 1973). There has been little temporal control except that it has been found stratigraphically later than Blackduck in Minnesota and has not been found with historic materials. Hurley (1974: 118) has assigned a temporal range of A.D. 900-1100 to the Clam River ceramics.

In southern Wisconsin, there is a long Effigy Mound sequence, construction of the large stockaded Mississippian or Mississippian-Woodland, "Old Village" Aztalan site, and the development of Oneota Composite. The Aztalan site was a Middle Mississippian intrusion circa A.D. 1100-1300 (Gibbon 1972: 174-176). It was characterized by Middle Mississippi pottery that included smoothed and incised sherds.

The Effigy Mound Tradition is a sequential development from A.D. 300 to A.D. 1642 (Hurley 1974: 116). Subsistence activities involved a nomadic hunter-gatherer-fisher economy. Linear, conical and effigy mounds have been found at many sites. The Madison Ware pottery has been characterized by a wide assortment of traits which reflect temporal changes (Hurley 1974). Hurley viewed

Aztalan as a blend of Effigy Mound and Middle Mississippian developments.

Oneota sites have been identified for the periods A.D. 900-1100, 1100-1300, and 1300-1650 (Gibbon 1972). The ceramics have been characterized by such Mississippian traits as shell tempering, angular shoulders, and spiralling broad-trailed decorative motifs. The Wisconsin Oneota ceramics lacked the standardization, division between utilitarian and ceremonial types, and regional homogeneity that has been found in ceramics from Middle Mississippian sites (Gibbon 1972: 171). The original Oneota influences predated the development of Aztalan and other large fortified Middle Mississippian sites, thus there were a series of consecutive Mississippian influences rather than one single movement of people or ideas.

During the period A.D. 1300-1650, large Oneota sites were replaced by small, more dispersed sites and some population relocation (Gibbon 1972: 176). The dispersion may have been due to climatic deterioration and/or break down of the forces that maintained social cohesion in larger settlements after communication with Middle Mississippian centres was severed.

During the Late Woodland Stage, there were at least two periods of pronounced change to the south of the Upper Great Lakes that resulted in population movement, changes in subsistence-settlement adaptations, and changes in technological traits.

A. Circa A.D. 800-1300 or 1400

1. Intrusions of Middle Mississippian populations who introduced horticulture and sedentary or semi-sedentary village life. Oneota Composite appeared, followed by large fortified settlements like Aztalan.
2. Symbiotic relationships established between horticultural villages to the south of the lakes and the nomadic groups north of the lakes (Fitting 1970).
3. Intensification of occupation in terms of site density and occupancy of large long houses within the sites.

4. Appearance of globular, fabric roughened Woodland ceramics and smooth, incised Mississippian ceramics.

B. Circa A.D. 1300 or 1400 to the historic period

1. Abandonment of large geographic areas, possibly due to climatic deterioration, e.g., most of southern, eastern, and northern Michigan and northern Wisconsin.
2. Oneota Composite underwent change as sites became smaller, more dispersed, and relocated.
3. Mississippian centres abandoned.

These developments have important implications for understanding the processes of change that were taking place in Southwestern Manitoba. The previous discussion on ethnohistory established that groups who utilized Southwestern Manitoba also included within their geographical range, the Upper Great Lakes and the Upper Mississippian areas. Some groups such as the Ottawa were noted traders who covered vast distances through trade relationships while all groups maintained inter-ethnic relationships by means of trade and/or warfare.

During the early part of the Late Woodland Stage, *circa* A.D. 800 to 1300 or 1400, new groups appeared, sedentary villages with a horticultural base became the norm, and a series of trade routes were established both with the Mississippian centres to the south and the nomadic groups to the north; these developments took place both south of the Great Lakes and in much of the Upper Mississippian Area as far north as central Minnesota (Fitting 1970; Gibbon 1972; Hurley 1974; Salzer 1974). Since these were historic influences from the Upper Mississippian and Upper Great Lakes areas, then these major changes during the Late Woodland Stage would be expected to influence Southwestern Manitoba as well. One line of evidence is the sudden appearance of the Blackduck Horizon as a westward spread of Algonquian groups.

The changes during the latter period of the Late Woodland Stage, circa A.D. 1300 or 1400 to the historic period, in the Upper Great Lakes Area, Upper Mississippian Area, and Southwestern Manitoba coincide sufficiently that one can infer direct interrelationships. At the beginning of this latter period, large expanses of Michigan and northern Wisconsin were abandoned and the distribution of Blackduck Horizon was reduced to exclude Manitoba and northern Minnesota, subsequently being confined to an area north of Lake Superior.

Clearly, an understanding of influences from the Boreal Forest and Eastern Woodlands on Southwestern Manitoba can be developed only through interrelating the archaeological record of Southwestern Manitoba with the record from the Upper Great Lakes, Boreal Forest, and Upper Mississippian areas. However, the ethnohistoric and Middle Woodland archaeological evidence shows that Plains groups also utilized Southwestern Manitoba. Therefore, it is necessary to be aware of developments on the Plains during the time period of the Late Woodland Stage, to be aware of the impact of the Woodland developments on the Plains, and to determine how these developments influenced Southwestern Manitoba.

Central and Northeastern Plains

Beginning *circa* A.D. 800 or 900, archaeological developments underwent marked changes when the Central and Northeastern Plains were being influenced by the Middle and Upper Mississippi developments. Among these changes were increased reliance upon horticulture, utilization of more permanent structures, and a shift to globular ceramics which had new traits such as handles, stamped surface finish, and incised decorative motifs.

The Central Plains area had no direct effect upon developments in Southwestern Manitoba but it had indirect effects through the transmission of traits into the Northeastern Plains as a result of historic, Coalescent developments. A brief overview of Central Plains changes is important in order to appreciate general changes on the Plains, the impact of eastern developments, and climatic shifts.

On the Central Plains, several sedentary groups are identified. These regional variants, identified as Upper Republican, Nebraska, Smoky Hill and St. Helena, have been previously lumped under a Central Plains tradition or phase and will hereafter be referred to as the Central Plains Sedentary Village Configuration (Wedel 1961; Willey 1966; Brown 1966; Wood 1969; Krause 1969, 1970). These groups shared certain traits such as:

a) square or rectangular earth lodges with long covered passageways;
b) structures scattered irregularly along creeks or rivers as villages, hamlets, or homesteads;
c) subsistence activities based upon cultivation of corn, beans and squash, and hunting and collecting;
d) general similarity in a variety of tools such as scapula hoes and knives, lithic side-notched projectiles, bifaces, scrapers, and shaft abraders, and bone shaft straighteners, beads, fishhooks and bow guards.

Differences appeared in resource utilization, presence of certain tool classes such as shell hoes, toggle head harpoons, and pipes as well as in ceramic traits such as choice of tempering, decorative techniques, and rim shape. The Mississippian influences were evident in the vessel form, presence of incised decoration, vessel handles, rim-effigy adornment and pipes (Willey 1966).

These horticultural village peoples entered from the south and east and displaced the previous, more nomadic occupants (Wood 1969: 102-103). They occupied the Central Plains from the Ninth to the Fifteenth centuries (Krause

1970: 108). The settlements included hamlets of six to ten lodges clustered along the terraces, smaller hamlets along the banks of tributaries, and seasonal creek-bank homesteads. The groups living in the eastern portions of the Central Plains augmented their horticultural produce with intensive hunting of local resources while those occupying the western portions relied less on horticulture and more on bison hunting (Falk 1969: 102).

There was some reduction in numbers of settlements, at least in the south-western portions, which may correspond in time to the Pacific I Climatic Episode of A.D. 1200-1450 (Wedel 1970; Lehmer 1970; Bryson et al 1970). New complexes or composites such as Lower Loup, Redbird, Great Bend and Dismal River are identified for the period circa A.D. 1450 to the 1800's, (Wedel 1961, 1970; Willey 1966; Wood 1965). Oneota sites appeared along the eastern portion of the area.

Lower Loup and Great Bend sites were larger than previous settlements, ranging from 15 to 100 acres. Lower Loup sites were often fortified. Circular earth lodges and storage pits were numerous. Pottery was usually smoothed or ridged due to manufacturing with a grooved paddle, often incised with hachured triangles, and modified with multiple handles. Horticulture was an important subsistence activity; however, hunting remained important with bison being most important, followed by pronghorn antelope, elk, deer and small mammals. Lower Loup sites have been assigned to the proto-historic and historic Pawnee (Grange 1968). The Great Bend sites have been assigned to Caddoans, particularly the Wichita (Wedel 1961, 1970).

The Redbird Focus was a protohistoric and early historic complex located in northeastern Nebraska. It has an estimated temporal range of A.D. 1600 or 1650 to A.D. 1700 or 1750 and has been assigned tentatively to the Ponca (Wood 1965). A Ponca assignment was based upon geographical and temporal distribution, settlement pattern, burial data, and the presence of small quantities of Oneota pottery, but most of the pottery and other artifacts were very similar to Lower Loup materials which had been assigned to the Pawnee. A discriminant functional analysis of the osteological remains suggests that the Redbird Complex was Ponca with some Arikara females present (Jantz 1974).

Dismal River sites in the western part of the Central Plains reflected a minimal orientation toward horticulture (Wedel 1961: 327). Pottery was infrequent, cord-roughened and minimally decorated. It has been tentatively attributed to the northern Plains Apache (Schlesier 1972). These sites lacked the structures, accumulation of debris and ceramic variability found in the sites of more sedentary groups.

Farther north, in the Dakotas, a number of archaeological manifestations have been defined and placed within various taxonomic categories. Most of the published research in this area has been confined to the Middle Missouri Sub-area (Figure 21). A taxonomic synthesis of research within the Middle Missouri valley of North and South Dakota has produced the Middle Missouri and Coalescent Traditions and several variants within each (Figure 22) (Lehmer 1954, 1970, 1971; Lehmer and Caldwell 1966). Detailed descriptions of these various units are precluded here in favour of an over-view of general subsistence-settlement studies plus a brief discussion of certain ceramic developments which have a bearing upon ceramic identification in southern Manitoba. A number of sites outside of the

Missouri River valley have been described as well. The implications of these sites for understanding the processes of cultural development on the Plains are included. The data on the Middle Missouri developments are summarized from Lehmer (1970, 1971) unless otherwise stated.

The earliest evidence of the sedentary villages in the Middle Missouri valley has been classed as the Initial Middle Missouri Variant. It appeared in the Big Bend and Bad-Cheyenne regions about A.D. 900, at the beginning of the Neo-Atlantic Climatic Episode (Lehmer 1970: 118; 1971: 95-97). The sedentary villages with mixed horticultural-hunting subsistence activities appeared as an intrusive, integrated unit from southwestern Minnesota and northwestern Iowa and

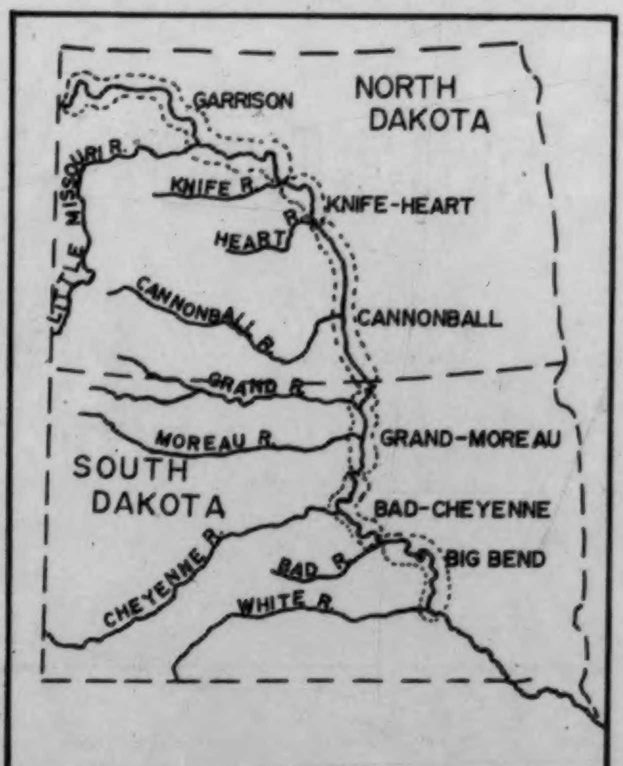
GARRISON
NORTH DAKOTA
MISSOURI R.
LITTLE MISSOURI
KNIFE R.
KNIFE-HEART
HEART R.
CANNONBALL R.
CANNONBALL
GRAND R.
MOREAU R.
GRAND-MOREAU
SOUTH DAKOTA
BAD-CHEYENNE
CHEYENNE R.
BAD R.
BIG BEND
WHITE R.

Figure 21. Middle Missouri Valley Area Showing Research Regions (Lehmer 1971: 29).

were regional extensions of the Mill Creek Complex of the Upper Mississippian Area (Lehmer 1970: 118). The Extended Middle Missouri Variant appeared about A.D. 1100, occupied much of the Middle Missouri valley with a northern expression along the Knife-Heart and Cannonball Regions and a southern expression along the Bad-Cheyenne Region, and both regional expressions shared sufficient traits to indicate that they developed from a common parent stock.

The Extended Middle Missouri Variant sites were concentrated in the northern part of the area and may indicate that the population originated in the northern

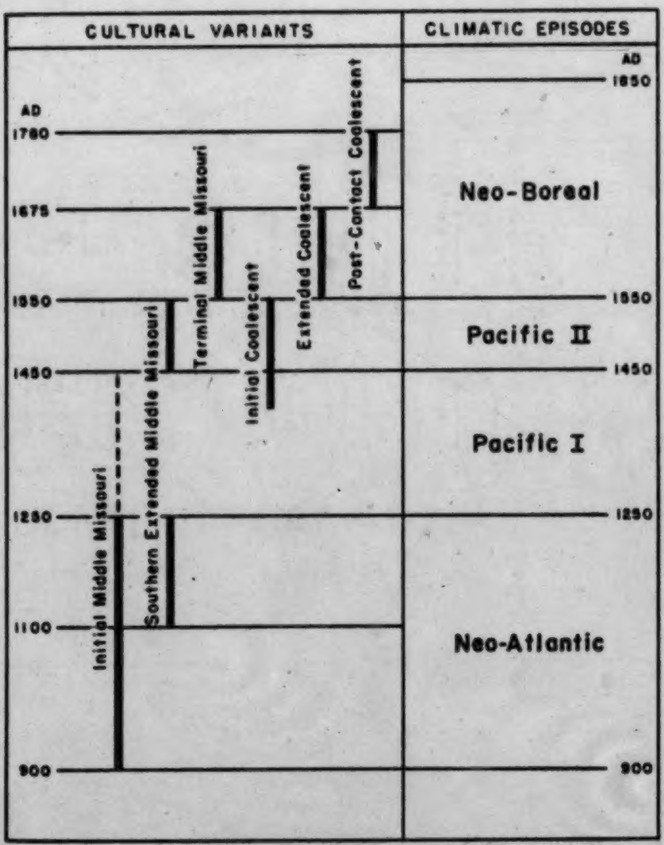

Figure 22. Major Climatic Episodes and Cultural Variants of the Middle Missouri Valley (Lehmer 1970: 127).

portion of the Missouri River valley (Lehmer 1971: 99). Subsequent movements involved a down river shift to the Bad-Cheyenne Region approximately A.D. 1100-1250 and subsequently resulted in both conflict between the occupants of Initial and Extended Variant sites as reflected by the development of fortifications and destroyed sites, e.g., Fay Tolten, and cultural interchange as indicated by the adoption of entrance ramps and simple stamped pottery in southern Extended Middle Missouri sites and the development of the Modified Initial Middle Missouri Variant.

Both variants had villages of rectangular earth lodges, some with fortifications. Southern Extended Middle Missouri sites consisted of 20 to 30 houses, whereas the northern sites consisted of only a dozen or so, the latter interpreted as evidence of hunting camps and other temporary settlements with very few permanent villages. Ceramics of the Initial Middle Missouri sites contained globular, grit-tempered, cord-roughened vessels whereas the Extended Middle Missouri vessels demonstrated a shift to simple stamping, by using a grooved paddle, in pottery manufacture. Pottery of both variants had flared rim and S-rim vessel profiles, but the Extended Middle Missouri vessels tended to have higher flared rims, rounded lips, and smoother curving rim interiors. Strap and loop handles were rare, lip tabs were more frequent, and decorative techniques involving incising, punctating, pinching, fingernail indenting and cord impressing occurred in both variants. Other tools included stone and bone projectile points, bifaces, scrapers, celts, mauls, abraders, weights or sinkers, bison scapula hoes, bison horn scoops or hoes, bone picks, bison or elk metatarsal fleshers, spatulas, bone knife handles, assorted bone awls, elk antler L-shaped fleshing handles, scapula knives, hooked bone knives, arrow shaft wrenches, fishhooks, beads, whistles, pendants, and bracelets. The presence of a number of items such as dentalium shell beads (West Coast origin), pendants of busycon columellae, pottery decoration with forked-eye motif, copper artifacts, plus shell and bone thunderbirds indicate contact with Upper or Middle Mississippian groups. Trade networks between the Initial Missouri and Extended Middle Missouri sites plus considerable materials and items from other areas have demonstrated that exchange mechanism were well developed.

During the Pacific I Climatic Episode, A.D. 1250-1450, the southern Extended Middle Missouri villages of South Dakota were abandoned, leaving the area occupied only by a few Modified Initial Middle Missouri sites. Little is known about either the fate of the southern Extended Middle Missouri Variant or of what was happening in the area occupied by the northern Extended Middle Missouri.

During the period A.D. 1400-1675, the Initial and Extended Coalescent Variants represented mixtures of traits of older Central Plains and Middle Missouri Traditions. The Terminal Middle Missouri Variant persisted in the Cannonball and Knife-Heart Regions approximately A.D. 1550-1675.

Terminal Middle Missouri developments included the rise of fewer but larger villages, several with over 100 rectangular earth lodges. The larger sites tend to be found within the Cannonball and southern Knife-Heart Regions and were often heavily fortified with bastioned palisades; the sites farther north were smaller and unfortified.

Terminal Middle Missouri ceramics were a continuation of the flared Riggs series and S-shaped forms of the Fort Yates series; however, a new rim form included high shallow S-rims, braced rims, and fillets added to the rim exterior. Check-stamped pottery appeared frequently in the earlier sites. Stone, bone and shell artifacts were more numerous and more elaborate. One new tool was the thin, grooved axe with raised ridges.

In addition to the Terminal Middle Missouri, the Initial and Extended Coalescent Variants appeared. The Initial Coalescent Variant, dating approximately A.D. 1400-1550, may have represented groups moving into the Middle Missouri sub-area from the Central Plains in response to drought conditions. The subsequent Extended Coalescent Variant, dating approximately A.D. 1500-1675, was an outgrowth of the Initial Coalescent.

The Initial Coalescent sites were confined primarily to the Big Bend Region of South Dakota. New traits introduced into the Northern Plains by means of the Initial Coalescent sites were circular houses, square lodges with rounded corners, and small conical structures, diamond-shaped knives with bevelled edges and pipes. Sites were large and fortified but the density of house structures was much less than for Terminal Middle Missouri sites.

The Extended Coalescent Variant sites were more widespread, located in the Big Bend, Bad-Cheyenne and Grand-Moreau regions, much more numerous, smaller, and occupied more briefly. Ceramics had a fine paste and were simple stamped or plain. A shallow S-rim profile, vertical striations or brushing, and thickened lips appeared. Unnotched projectiles, catlinite pipes, metatarsal fleshers, L-shaped antler fleshing adzes, and bone sliders were more important. The choice of lithics was varieties of chalcedony, jasper, chert, quartzite, and quartz, whereas the Middle Missouri Tradition sites contained high proportions (often up to 75%)

of Knife River flint.

Extended Coalescent ceramics frequently had incised patterns as decoration. The incising technique was used to create bands of repetitious alternating triangles filled with closely-spaced parallel lines (Wood 1962). Surface finish was simple stamped or plain.

Some of the northern Extended Coalescent sites were fortified. The presence of these fortifications in addition to fortified Terminal Middle Missouri sites implies conflicts with each other or some common enemy.

Traits were exchanged between Extended Coalescent and Terminal Middle Missouri settlements. Many of the differences were eliminated as a blend of traits replaced the earlier distinctions.

The Post-Contact Coalescent, A.D. 1675-1780, represents the settlements of the Arikara of South Dakota and Mandan and Hidatsa of North Dakota. There was considerable variation in village sizes and plans. Fortification increased during the latter part of this period. Circular houses appear to have been the predominant style although rectangular structures persisted at some sites. Pottery resembled the Middle Missouri materials; exteriors were simple stamped or plain and decorative techniques included cord impressing, incising, punctating, fingernail indenting, and pinching at the lip. Vertical brushing became popular, particularly in South Dakota. Shallow, straight, and braced rims were important. Historic items of metal and glass appeared in varying quantities.

The Post-Contact Coalescent represented a cultural convergence in which a number of different groups selected certain traits from a combined sample of traits that emerged from different traditions. Some choices such as circular houses may have been based upon functional criteria, but other traits such as the cord impressing decorative technique on ceramics appeared to have been arbitrary cultural decisions.

Both trade items and traders appeared at the villages. There was a brief economic florescence during this period as expressed in more hoes for greater agricultural productivity and more artifacts per cubic yard of refuse (Lehmer 1971: 172).

The Disorganized Coalescent, A.D. 1780-1862, represents a period of drastic population reduction due to epidemics, increase in European artifacts, and reduction in area occupied until finally, only one village existed. Pottery declined in quality and lithics declined in quantity.

Evidence of ceramic components outside the Missouri River valley of the Dakotas is sparse. The Biersterfeldt Site was a typical Post-Contact Coalescent Plains Village Tradition site along the Cheyenne River of southeastern North Dakota (Wood 1971a). It contained historic European items and was tentatively identified as an historic Cheyenne village occupied during the latter half of the Eighteenth Century. The ceramics resembled Talking Crow and Stanley Wares, and, in terms of decorative motifs, resembled Arikara and Pawnee ceramics more closely than the Mandan or Hidatsa ceramics (Wood 1971a: 46-47). Two distinguishing characteristics of the Biesterfeldt Site were the popularity of linear check stamping (3.4% of the body sherds) and the importance of cord-wrapped dowel impressions (44% of the vessels); the latter occurred only in minor frequencies at a few Missouri River sites. The high percentage of the cord-wrapped dowel impressions indicated a blend of Woodland and Middle Missouri traits. Unfortunately, no other sites containing the Biesterfeldt Complex have been excavated.

A second ceramic complex, the Stutsman Focus, was defined on the basis of a series of sites along the James River of eastern North Dakota (Wheeler 1963). This complex has been estimated to date A.D. 1750 to 1770 to 1800 which makes it contemporaneous with Biesterfeldt and a number of Post-Contact Coalescent sites. Recent research in North Dakota produced ceramics that were identified as Stutsman material accompanied by a date of A.D. 1245 ± 70 (UGa-1097) (Vehik and Vehik 1975); however, Wood (1976: personal communication) is of the opinion that the sample in question does not represent Stutsman ceramics.

Wheeler (1963: 205-212) believed that the Stutsman Focus was intimately related to the Painted Woods Focus. The latter, also known as the Heart River Phase (Lehmer 1971: 203-204), has been tentatively assigned to both the Mandan and Hidatsa. The Stutsman Focus has been characterized by unfortified, semi-permanent village sites of small, circular, earth-covered lodges, transitory campsites on the alluvial terraces, and eagle-trapping sites. The structures had long covered entryways and subfloor cache pits. They were randomly but closely spaced.

The ceramics were highly variable. In order to analyse them, five locally identified wares with thirteen types and nine Middle Missouri types were used. As a group, the ceramics were:

> . . . globular jars of apparently small size, for culinary purposes, with rounded, flattened, beveled, everted, pointed, or interiorly or exteriorly extruded lips, and incurved, flared (unthickened, or "braced" or "wedge-shaped"), collared, or S-shaped rims; undecorated, or decorated with rectilinear or rarely curvilinear dentate stamped, incised-trailed, cord impressed, tool impressed, punctated, wrapped stick impressed, check stamped, scored, or painted designs on the lip, exterior and/or interior

> rim surfaces and shoulder area. Bodies are simple stamped, cord-marked, or smoothed. Strap handles and lugs occur infrequently. (Wheeler 1963: 228).

The broad-trailed designs are reminiscent of Oneota decorative motifs. The dentate stamp decorative technique, particularly on braced and S-rims with check stamped surface finish, is similar to more westerly materials such as the Mortlach Complex. The cord impressed technique on S-rims is similar to Coalescent forms in the Middle Missouri valley.

Faunal remains were overwhelmingly bison. Lesser amounts of dog or coyote and small amounts of pronghorn antelope or deer, badger, grey fox, skunk, beaver, jack rabbit, pocket gopher, ground squirrel, unidentified bird and fresh water mussels were also found. The sites were identified as semi-nomadic communities with subsistence based upon horticulture (no evidence), hunting, and collecting (Wheeler 1963: 228-229).

At present this complex represents an isolated manifestation that has not been linked with any of the contemporaneous complexes or antecedents. Its presence clearly illustrates the fragmentary nature of current knowledge on ceramic complexes outside of the Missouri River valley.

The few excavations that have been conducted in eastern North Dakota reflect several archaeological manifestations that overlap in ceramic traits but contain their own distinctive characteristics. The nature of the relationships and the ethnic identity of the defined components are tentative. The lack of research in northern and northeastern North Dakota plus the minimal research in southeastern North Dakota have resulted in a very inadequate understanding of the nature of the associations of various archaeological complexes. Two facts are, however, evident. The archaeological record is complicated and the various archaeological complexes contain overlapping frequencies of many ceramic traits.

The significance of these facts on the Manitoba record is evident in the few efforts that have been made to relate Manitoba ceramics with ceramics from the Dakotas. The term "Mandan" has been assigned to pottery from Southwestern Manitoba (Wintemberg 1942: 138; MacNeish 1958: 161, 171, 174; Capes 1963: 108-109, 144-145) based on the presence of pottery with horizontal or curved designs of the cord-impressed decorative technique, finger pinching, and flanges or tabs. Despite the warning by Griffin (who edited the Wintemberg manuscript) that cord-impressed patterns were not necessarily Mandan and were also found on Woodland ceramics, the identification of pottery as Mandan persisted. Part of this orientation can be attributed to the habit of conducting comparative studies on the basis of published photographs; effective comparison must involve examination of actual sherds in order that traits such as texture, density, and tempering can be adequately assessed. A perusal of collections in the North Dakota State Historical Society from Missouri village sites during the summer of 1972 revealed that the village materials from North and South Dakota resembled some Southwestern Manitoba materials superficially in shared decorative traits such as cord-impressed patterns with both horizontal and curved "rainbow" designs plus S-shaped lip profiles. However, the sherds from Manitoba demonstrated sufficient differences in curvature, texture, and tempering to identify them as part of a ceramic configuration separate from the Middle Missouri or Coalescent Traditions but reflecting borrowing of ideas or common ancestry. Wood (1974: personal communication) identified Southwestern Manitoba materials as being different from Middle Missouri materials; only one rim sherd from numerous sites could be identified as being unmistakably Mandan.

A number of sites contained sherds with similar decorative motifs, such as cord-impressed patterns, have been recorded from the Pembina Valley to the east of the research region (Joyes 1969; Reid 1972). Joyes (1969: 143-145, Plate 24a, b) reported eight sherds of Fort Yates Cord-impressed ceramics from the Avery Site and Reid (1972: 91-93, Plate XI c-e) defined two classes of rim sherds from the Lowton Site as Fort Yates Cord-impressed. These cord-impressed sherds represented minority elements, e.g., 39 of 291 rim sherds (13.4%) from the Lowton Site collection and 8 of 252 rim sherds (3.2%) from the Avery Site excavation. Neither site represented a single component. These sherds may, in the future, be assigned to some as yet unidentified ceramic complex reflecting the variability of the Stutsman Focus materials.

Developments on the Northeastern Plains

During the period equivalent to the Late Woodland Stage, changes on the Northeastern Plains were markedly parallel to developments in the Upper Mississippian and Upper Great Lakes areas except that evidence for movements of populations in the Northeastern Plains Area shows that distributional stability may have been less likely. It must be remembered that during the historic period, groups from Southwestern Manitoba and the Boreal Forest to the east had developed symbiotic hunter-horticlutural exchanges of basic commodities, trading relationships, and conflict relationships through warfare.

Postulate 15

During the Late Woodland Stage, there were a series of migrations of populations into the Northeastern Plains both from the Upper Mississippian and Central Plains areas.

A. Circa A.D. 800 or 900 to 1100

1. There was a sudden shift of populations from the Upper Mississippian and Middle Mississippian areas to the Northeastern and Central Plains areas coinciding with the Neo-Atlantic Climatic Episode.
2. These populations brought or developed a sedentary or semi-sedentary horticultural subsistence based on domesticated plants (corn, beans, and squash) and hunting.
3. The Upper Mississippian village plan of small settlements composed of permanent, rectangular structures was introduced.
4. New traits included globular cord-roughened vessels and horticultural tools such as scapula hoes.

B. Circa A.D. 1100 to 1250

1. Pronounced regionalism developed, e.g., northern and southern Extended Middle Missouri assemblages are identifiable.
2. Conflicts occurred between groups, resulting in fortification, site destruction, and geographical separation.

C. Circa A.D. 1250 to 1400

1. Depopulation and reduction in village settlements possibly due to adverse conditions of the Pacific I Climatic Episode. Southern Extended Middle Missouri populations reduced or left; fate of northern Extended Middle Missouri populations unknown.
2. Appearance of new, but as yet poorly defined, complexes of nomadic populations outside of the Missouri River Valley; e.g., Stutsman Complex.

D. Circa A.D. 1400 to 1800

1. Major population shifts took place. Historic groups from the Northeastern Plains like the Ponca and Omaha moved to the Central Plains. Also, evidence of movement of groups from Central Plains into Northeastern Plains.
2. Marked increase in exchange of traits between villages, e.g., vessels with multiple handles.
3. Villages were larger than for previous periods and were often fortified.

Postulate 16

> The development of sedentary villages on the Northeastern Plains created the focal points for trade networks similar to those of the historic period.

The presence of artifacts of dentalium, busycon, and copper and Mississippian traits such as the forked-eye motif provide evidence of trade connections between the Plains sedentary villages and the West Coast, Upper Great Lakes, and Middle Mississippian Area. All of these traits persisted into the historic period.

Unfortunately, most of the items traded in the aboriginal intertribal trade networks were perishable items (Ewers 1968: 18-22). The village tribes traded mainly horticultural produce, e.g., corn, beans, squash and tobacco for dried bison meat, hides and clothing from the nomadic hunters.

The archaeological evidence is confined to a few non-perishable, exotic items such as shells and ceremonial items. However, the early reports on traditional Native exchanges show that all of the Plains nomadic groups traded for horticultural produce at the villages and that tribes that had been former horticulturalists, such as the Cheyenne and Crow, were particularly fond of corn (Ewers 1968: 19-20). Therefore, it is also likely that prehistoric tribes traded at prehistoric horticultural villages and that prehistoric tribes who had recently abandoned horticultural activities required horticultural produce through trade. Thus a symbiotic relationship between horticulturalists and nomadic hunters probably emerged early in the Late Woodland Period as the respective groups came to rely upon items that they could obtain readily through trade and had to exert greater effort to obtain materials for trade.

Postulate 17

> Population growth took place on the Northeastern Plains during the Late Woodland Stage.

Quantitative data between the Middle and Late Woodland stages are lacking. However, populations did move into the area and persisted until the historic period on a reliable subsistence base of horticulture, bison hunting, and hunting of diverse, wooded valley resources such as deer and small fur-bearers. During the Late Woodland Period there was an increased number of complexes, increased number of sites associated with the complexes, and increased sizes of sites. Recent estimates of the magnitude of these populations suggest that within an approximately 912 km length of the Knife-Heart Region in the Missouri River Valley, for the period 1675-1750, there were 16,484 people (Lehmer n.d.). Villages of over 100 structures and 1,500 people, for the period, reflect the magnitude of these tribal villages prior to population decimation due to European diseases.

Hypothesis 11

> The historic symbiotic relationships between nomads of the Northeastern Plains as a whole, and Southwestern Manitoba specifically, and the Middle Missouri villages developed early in the Late Woodland Stage.

The historic relationships included annual trading of bison meat and hides by the nomads for horticultural produce of the village tribes. Other items were clothing, tools, trinkets, folk tales, songs, dances, and brides (Wood 1972: 164-165). The exchange of basic food items provided greater subsistence reliance to both the nomads and village dwellers. Similar symbiotic relationships would have been equally advantageous to both groups in the past. Groups occupying Southwestern Manitoba as part of a seasonal, nomadic round would have survived more readily with horticultural produce of the villagers.

The archaeological evidence is equivocal. The Blackduck sites in southern Manitoba do have the long, narrow, parallel-sided bifaces that are common in Missouri village sites (Lehmer 1971: Fig. 45). Traits found in Southwestern Manitoba sites that represent exchange of items and ideas with Missouri sites include stone axes with double raised ridges and ceramic decorative traits such as horizontal and curvilinear cord-impressed motifs, check stamping, filleting and curvilinear incising (MacNeish 1954; Capes 1963; Lehmer 1971).

Furthermore, these village sites on the Missouri River were trade centres before the historic period, in which non-local items were circulating among groups throughout much of the continental interior. If prehistoric groups who inhabited Southwestern Manitoba were interested in non-local materials, then they would have traded at these centres. Examples of prehistoric Gulf Coast shell "masks" and gorgets and columella beads are good evidence that prehistoric populations were interested in non-local items (Capes 1963). While it can not be proved that population A of Southwestern Manitoba visited village site N during a given year for barter of a specific list of items, the presence of items that had been obtained through trade networks, the presence of items and traits attributable to Missouri village populations, and the obvious mutual economic advantage of trading for perishable food resources provide strong arguments for the existence of the prehistoric symbiotic relationship.

Burial Complexes on the Northeastern Plains

Burial mounds have been reported throughout the Northeastern Plains. Some of these mound groups, particularly those in South Dakota and southern North Dakota, have been incorporated into the Early Plains Ceramic Village Configuration on the basis of associated ceramics. Mound groups along the upper Red River have been assigned to various Minnesota complexes. Numerous mounds that have been reported for North Dakota, southern Manitoba, and eastern Saskatchewan do not fit into these previously discussed complexes.

Mound excavations in Manitoba have a long history. A brief review of developments in Manitoba demonstrates problems of working with mound materials in general. The problems of incorporating Manitoba mounds into the cultural record include:

a) the questionable excavation techniques and subsequent reporting of results during the late Nineteenth and Twentieth Century (Bell 1885, 1886; Bryce 1885, 1887; Gunn 1868; Montgomery 1908, 1910);
b) the overwhelming impact upon interpretations due to preconceived ideas as to which cultural groups occupied Manitoba and built the mounds (Vickers 1948, 1950; MacNeish 1954, 1958; MacNeish and Capes 1958; Capes 1963);
c) the difficulty in assigning mound contents to any particular complex because of the rarity of grave goods;
d) the paucity of radiocarbon dates.

Many of the mound excavations of the late Nineteenth and early Twentieth centuries were the result of weekend relic hunters or local farmers. With respect to Manitoba mounds, Vickers noted that:

> With the exception of Nickerson's work in 1913 (and he was unlucky) all of the excavations of our mounds were hurried and extremely careless. This somewhat acid comment being applicable to the amateur and trained scientist alike. The documentation is equally inadequate and much of the material has been lost or destroyed. Ninety per cent of the mounds known to this writer have been deliberately molested and robbed without much regard for their scientific and historic value. (Vickers 1948a: 6).

Most efforts involved digging into the centre of a mound with shovels.

Montgomery's excavations in Southwestern Manitoba involved frequent excavations with a team of horses and scraper; the results destroyed any contextual data and prevented the possibility of distinguishing between original and intrusive burials.

The mounds have been assigned to a number of different groups. Both Bell and Bryce advocated that a special race of Mound Builders had built the mounds. Bell emphasized the interlinked water routes from the Mississippi River to the Red River, Lake Winnipeg and Hudson Bay via the Nelson River, on one hand, and the linkage with Asia via the Saskatchewan River and Mackenzie drainage to the west. Bryce (1885: 14, 26, 1887) speculated wildly and identified the Mound Builders as Takawgamis who were a mixture of Mandans and Welsh or Toltecs who were ultimately defeated by the "Iroquoian" and "Siouan", the latter whom he believed to be two branches of the Aztecs. Despite the comprehensive data presented by Thomas (1894) that mounds had been built by a variety of Native peoples over a long period of time, the idea of the Mound Builders as a special race persisted for decades.

Vickers (1947, 1948a) cautiously postulated that most of the mounds in western Manitoba had been built by the Assiniboin and that the mounds along the Red River plus some in the Pembina Valley had been built by some other group. The latter burials were assigned to Wilford's Red River Aspect on the basis of the presence of trapezoidal shell pendants, flat circular shell beads, and pit burials (Vickers 1948a: 6). Many of the mounds were tentatively attributed to the Manitoba (Blackduck) Phase and hence the Assiniboin on the basis that the mounds contained one or more of the following:

a) burials in a sitting position;
b) small mortuary vessels;
c) sherds with cord-wrapped rod impressions in the fill.

MacNeish (1954, 1958: 49-50, 64-67) assigned Manitoba mounds to his Manitoba (Blackduck) Focus on the basis of the presence of seated burials, unilateral barbed bone harpoons and Blackduck sherds in the mound fill. Most of these variables are unreliable either because of recording of early reports or the questionable assumptions involved.

Vickers (1947: 110) indicated that there was some uncertainty about the identification of burials in sitting positions. Some examples such as one of the burials from the Fidler Mound near Lockport, Manitoba showed that some burials were definitely sitting erect with the head located above the vertebral column (Bryce 1904). Nickerson, on the other hand, found that many of the burials were flexed and lying on their sides and believed that the interpretation of seated burials had been based upon the inference that the flexed burials represented sitting burials that had fallen. Thus, many of the early reports of seated burials constitute questionable interpretations.

The presence of small mortuary vessels in the Manitoba mounds does not signify a Manitoba Phase, or Blackduck Horizon, identification. The Blackduck mortuary vessels from Minnesota are characterized by vertical corded surface finish and cord-wrapped dowel and/or punctate decorative motifs. None of the reported Manitoba mortuary vessels have these characteristics.

The presence of Blackduck sherds in the fill of a mound can indicate that the mound:

a) was built in a village or camp occupied by the people who made the Blackduck ceramics;
b) in a village occupied by someone who had been in contact with manufacturers of Blackduck pottery and had some Blackduck vessels;
c) that the mound post-dated a Blackduck village.

Therefore, most of the early reports of the presence of Blackduck sherds have little substantial value for identifying a Manitoba mound as being Blackduck.

Among the mound concentrations that exist on the Northeastern Plains there are several that can be tentatively assigned to mound complexes on the basis of similar burial items. These mound complexes must be viewed as temporary classificatory units subject to modification when the total complex is identified. They provide important data on influences from other areas and indicate to some degree the gaps that exist in the cultural history of an area.

The Devil's Lake-Sourisford Burial Complex consisted of a series of conical burial mounds with subsurface pits and burial items demonstrating Southern Cult influences. Much of the information is based upon the work of Montgomery (1908, 1910, 1912), but more recent works have provided insights into its distribution (Nickerson 1914; Vickers 1945, 1951a; Howard 1953; Capes 1963; Isinger 1971; Hanna 1973b). Howard characterized the Southern Cult by the following traits:

> . . . use of copper, bison hunting, utilization of molluscs, use of whelk shell gorgets of Southern Cult type, scratched drawing on the back of these gorgets, use of pendants or beads made from the spiral axes of whelk shells, use of straight "cigar holder" shaped catlinite pipes, use of incised catlinite tablets, and use of elk antler "collars" and/or "anklets" with incised designs. Art motifs which appear to be characteristic are: bilateral symmetry in much of the art work, incision of certain "key" lines so deeply as to completely penetrate the object being decorated, "line of life" conventionalization on many animal representations, frequent use of a diamond shaped figure to represent the eye of an animal, tiny legs on animal representations in comparison to the other parts depicted, and characteristic rectangular bodies on animal representations (Howard 1953: 137).

The marine shell gorgets generally had at least two drilled holes for eyes and a nose but also occasionally had the bilobed weeping-eye motif (Montgomery 1910: 56; Howard 1953: 135). Mortuary vessels were smooth, globular, generally spiral incised and had lips decorated by two or four small incised tabs with linear or zigzag designs of incising along the top of the lip (Montgomery 1906: 642, 1908: 34; Howard 1953: 136). Sites like the Reston burial (Braddell et al 1970) in Southwestern Manitoba had a small, smooth mortuary vessel with the same lip decoration and an incised Thunderbird and broken arrow; the intrusive burial in the Moose Bay Mound (Hanna 1973b) in Saskatchewan had a small mortuary vessel with four incised turtles identical to those found in Southwestern Manitoba. The incised tablets, which are generally made from catlinite, had readily identifiable designs of beaver, turtle, bison, deer, and one with a horse (Montgomery 1906: 644; Howard 1953: 137). The shell materials included large, cylindrical beads made from the columella of heavy marine shell, flat "washer-shaped" beads, notched trapezoidal pendants, and button-like shell beads. Birch bark baskets were frequently found.

The known sites and surface finds were scattered throughout eastern North Dakota (Montgomery 1906; Howard 1953), southern Manitoba (Nickerson 1914; Capes 1963) particularly near the confluence of the South Antler and Souris rivers and the Reston Site, the Pembina Valley of south-central Manitoba (Capes 1963; Vickers 1945, 1951a; Montgomery 1910), and southeastern Saskatchewan, particularly along the Assiniboine and Qu'Appelle rivers (Montgomery 1908; Isinger 1971; Hanna 1973b). In Manitoba, sites that are tentatively assigned to the Devil's Lake-Sourisford Burial Complex are:

a) Mounds C, E, H and R, plus mounds 6, 7, 8, 9, 10 and 11 by Montgomery and Thomas and mounds 1, 2, 6, and 9 by Bryce (1904) (Capes 1963: 165-166) on and near the confluence of the North Antler and Souris rivers;
b) mounds 2 and 9 at the confluence of the South Antler and Souris rivers;
c) Star Mound, Sims Mound, Rock Lake Mounds, Sykes Mound, and Calf Mountain of the Pembina Valley Region (Capes 1963: 172-175);
d) Westbourne, Arden, and McGorman mounds of the White Mud River basin;
e) the Lone Mound along the Assiniboine River near Brandon;
f) the Reston burials;
g) the Feland Site.

One must remember, however, that any one of these mounds has only one or more of the diagnostic traits and that there may have been regional, temporal or cultural differences within the above cluster of traits, e.g., mortuary vessels with the single, spiral-incised motif have been found only in the southwestern region of Manitoba, and Wells and Ramsey Counties in North Dakota (Montgomery 1908; Howard 1953; Capes 1963).

The Devil's Lake-Sourisford Burial Complex is difficult to date. Dates of 665± 175 B.P. (S-743), A.D. 1285± 175 (Rutherford 1973: Personal communication) for the Reston burial and A.D. 1040± 70 (Hanna 1973b: 92) for the Moose Bay Mound indicate a relatively late period. More indirect is the Feland Site (on the South Antler River near the North Dakota-Manitoba border), which yielded fragments of vessels, several with smooth surfaces and some with curvilinear incised decorations and lip decoration consisting of straight and zigzag lines identical to those found on many of the mortuary vessels (Syms n.d.a). The Feland Site date is 500± 130 B.P. (S-686), A.D. 1450± 130 (Rutherford 1973: personal communication). There is some evidence that this burial complex persisted into the historic period. Montgomery (1906: 643-644) found what appears to be an historic copper cover for a knife handle in the same mound as a spiral-incised vessel, but his crude excavation techniques (a scraper hauled by a team of horses) were not designed to detect intrusive burials and items. The Bentz Southern Cult marine shell gorgets with the incised horse was found eroding out of a river bank near Moffit, North Dakota (Howard 1953: 133-135). A temporal range of A.D. 1000 to A.D. 1600 is tentatively suggested. Howard (1956)[11] has recorded that marine shell gorgets were used in Kansa war-bundle ceremonies as late as 1883.

The prevalence of Southern Cult materials and certain forms of shell beads imply associations with the Arvilla Burial Complex and/or Oneota relationships. The Devil's Lake-Sourisford and Arvilla burial complexes have, in common, items such as columella beads, washer-shaped beads, trapezoidal shell pendants, bone bracelets, and copper artifacts; however, the Arvilla Complex has many different items such as antler hafts, bear and elk canines, elbow pottery pipes, and Woodland mortuary vessels that include Blackduck and St. Croix Stamped types (Johnson 1973). The Arvilla temporal estimates of A.D. 500 or 600 to A.D. 900 predate the Devil's Lake-Sourisford materials but the presence of Blackduck vessels in Arvilla mounds provide evidence of probable temporal overlap.

Southern Cult traits are also quite frequent with Oneota materials and appear in more elaborate forms in Middle Mississippi, Caddoan, and Southeastern Mississippi sites (Howard 1956, 1968; Betancourt 1965; Webb 1971). Oneota materials have been assigned to Siouan groups such as the Dhegiha-speaking Osage and

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[11] Howard (1956: 302) cites a Kansa account in which smoke from a pipe is blown into the shell after which it ascends to the thunder god who finds it pleasant. The thunder god is often depicted as a thunderbird which provides further evidence to substantiate the association of mortuary vessels with thunderbirds, e.g., Reston burial, with the Southern Cult.

Kansa and the Chiwere-Winnebago-speaking Winnebago, Iowa, Oto, and Missouri (Howard 1956: 302; Wedel 1961: 119-121).

The other Manitoba mounds require re-assessment. Many of the artifacts excavated by Montgomery have not been analyzed. No systematic effort has been made to do a comprehensive associational analysis using grave goods, burial types, mound forms, and biological populations. The radio-carbon dates of A.D. 620± 90 (Gak-1883) on the Riverview Mound, A.D. 1100± 90 (Gak-1882) on the Heath Mound, and A.D. 1560± 90 (Gak-1881) on Mound G from the confluence of the North Antler and Souris rivers show that mounds were built over a long time interval (Syms 1971). Nash (1974: 28) dated a disturbed mound on the outskirts of St. James-Assiniboia (suburb of Winnipeg) to A.D. 1730± 90 (I-4684); the only artifacts, including a trapezoidal shell pendant, end scraper, and unnotched triangular projectile point, were situated in the mound fill.

Increasing numbers of Late Woodland mounds, some with intrusive historic burials have been recorded in other parts of the Northeastern Plains (Howard 1968b; Chomko and Wood 1973). Many of these are undated, lack diagnostic artifacts, or have not been placed within existing frameworks. The state of knowledge on the mounds in the Northeastern Plains requires more data, further investigation, and a complete re-evaluation (Hanna 1973b: 104).

Research in Southwestern Manitoba during the late Nineteenth and early Twentieth centuries was directed primarily toward mound excavations. The difficulties in interpreting mound remains have been discussed; however, on the basis of a re-evaluation of the current data on mound materials, there appear to be at least four Late Woodland burial complexes on the Northeastern Plains:

a) an extension of the Arvilla Burial Complex down the Red River into southern Manitoba which co-exists or overlaps temporally with the Blackduck Horizon, A.D. 800-1400;
b) the Devil's Lake-Sourisford Burial Complex extending from northeastern North Dakota through Southwestern Manitoba to eastern Saskatchewan and dating A.D. 1000-1600;
c) Blackduck Horizon mounds, A.D. 800-1400;
d) a fourth possible burial complex represented by the initial burials of the Moose Bay Mound in Saskatchewan (Hanna 1973b).

These four variations in burial complexes plus four radiocarbon dates from mounds in southern Manitoba spanning a period of A.D. 530 to 1820 (at 1σ) reveal a complicated record requiring further research. Previous efforts to assign all of the mounds from Southwestern Manitoba to a single Melita focus or culture or to assign all mounds of Manitoba to only two complexes (MacNeish 1954, 1958; Capes 1963; Ossenberg 1974) did not adequately portray the variability that occurs. The limitation of previous researchers was their inability to realize the complexity of the prehistoric and ethnohistoric record of the Northeastern Plains.

Plains of Saskatchewan and Alberta

An evaluation of ceramic developments on the Plains of Saskatchewan and Alberta is hampered by the paucity of research and detailed descriptions. In Saskatchewan, the ceramic record is limited to a general overview based upon surface collections (Kehoe 1959; Vickers 1973), the description of limited samples from excavated sites such as Mortlach (Wettlaufer 1956), Long Creek (Wettlaufer and Mayer-Oakes 1960), François Le Blanc (A. Kehoe 1964) and Gull Lake (Kehoe 1973), and of individual vessels (Hodges 1967, 1968).

On the basis of limited samples of surface ceramics, Kehoe (1959) defined Ethridge and Wascana wares of a Pisamiks Tradition. No typology nor illustrations accompanied the report. These ware categories demonstrated extreme overlap in attributes and contained such a high degree of variability that they are useless for determining taxonomic relationships (Vickers 1973: 5). Vickers (1973) attempted to classify sherds from a series of surface collections according to surface finish, rim form, decorative techniques, and decorative motifs according to frequencies of trait clustering but found that the surface samples were not conducive to such a classification.

The earliest known ceramics in Saskatchewan that postdate the Early Ceramic Plains Village Configuration is a single vessel from the Gull Lake Site, Layer 24 (Kehoe 1973: 122, 194). This vessel was globular and decorated with at least six horizontal rows of cord-wrapped cord impressions. It was defined as Gull Lake Cord-impressed which creates unfortunate terminological confusion since the term "cord-impressed", as used on the Northeastern Plains, applies to a decorative technique in which individual strands of twisted cords are impressed in the moist clay.

As Kehoe has indicated, this vessel resembled some Blackduck Horizon, Lake Michigan, and Mackinac ware specimens in decorative motif. A radiocarbon date of A.D. 730± 80 (S-149) overlaps with, and is lightly earlier than, the earliest Blackduck dates from Manitoba. This early date in Saskatchewan provides evidence that the Blackduck Horizon may have expanded into the Western Plains during its early explosive spread.

Layer 15 at Gull Lake has produced a globular, smoothed-over open-weave vessel identified as Gull Lake Plain. It was found in the upper levels that contained Prairie Side-notched projectiles and was estimated to date A.D. 1000-1200

(Kehoe 1973: 122-123). It was cited as being comparable to specimens from the Brockinton Site; however, I would not agree that it bears any more than the vaguest similarity in form and surface finish to any vessels from the Brockinton Site, and it certainly lacks sufficient similarities to place it in any similar typology. Efforts to demonstrate similarities with Extended Middle Missouri ceramics from the Fire Heart Creek Site (Kehoe 1973: 123) are unwarranted, and while similarities with Riggs Plain vessels from the Terminal Middle Missouri Shermer Site may appear valid on gross morphology, there are unresolved problems with respect to differences in all other artifact categories. A sample of one undecorated vessel is difficult and dangerous to compare with any other site.

Other excavated samples of ceramics appeared much later. The Moose Jaw Complex, Mortlach Complex, and an upper component from Gull Lake (Layers 6-8) have been tentatively assigned to the Eighteenth Century. The Moose Jaw Complex was based upon a sample from the upper levels of the Mortlach Site (Wettlaufer 1956: 23-35, Plates 2-4). An evaluation was hampered by the lack of quantification and detailed description, particularly decorative techniques.

The Moose Jaw Complex

The Moose Jaw Complex ceramics were variable with respect to surface finish and decoration. The data were not quantified but the most common pots appear to have been globular vessels with smoothed, closely woven vertical fabric surface finish. The predominant decorative elements were exterior lip notching and parallel lip incising. Minor elements included cord-wrapped dowel and cord-impressed decorative techniques. There was also some evidence of shallow-profiles and "basketry" surface finish. Two components were defined: the upper layer was assigned a date of A.D. 1750 on the basis of one European blue bead and one reworked gun barrel found in the roots of the sod.[12] The remainder of the complex contained lithic side-notched projectile points, scrapers, and bifaces, bone awls, fleshers and gaming pieces, plus worked shell (Wettlaufer 1956: 23-35). Tanged and eared forms of projectile points were found in lower levels. At present, this complex can not be related to other published reports. Wettlaufer (1956: 26) believed that the centre of distribution of the complex was the region around the city of Moose Jaw and along Moose Jaw Creek.

The Mortlach Complex

The Mortlach complex was defined from material recovered from the uppermost levels at the Mortlach Site (Wettlaufer 1956) and the Long Creek Site (Wettlaufer and Mayer-Oakes 1960) in Saskatchewan, but nearly identical materials from the Shippee Canyon Site (Joyes 1973) in northeastern Montana are better described. The pottery was characterized by a predominance of plain (54%), check-stamped (23%) and simple-stamped (8.3%) surface finish with oblique dentate stamped decoration on the exterior portions of interiorly bevelled rims (Joyes 1973: Plates 3, 4). A small portion of the sample consisted of straight-rimmed sherds with exterior lip notching. Associated tools included late side-notched projectiles, scrapers, bifaces, bone awls, spatulas, knapping tools, beads and knife handles, plus historic iron blades and projectiles, glass beads, and gun flints in small quantities. The faunal remains indicated that bison was the predominant animal, followed by dog, coyotes, foxes, eagles, rabbits, pronghorn antelopes, a mule deer, fish, and fresh water molluscs.

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[12] This historic association is highly tenuous since in that part of the site, the Moose Jaw Complex did not contain a component above it whereas in other portions of the site, two levels of Mortlach Complex materials existed. The historic materials may have been left at a later date.

The Fall River components of the Long Creek Site contained identical vessels but demonstrated more variability and different frequencies of certain traits. Check-stamped surface finish was most important (approximately 40%) followed by cord-wrapped paddle, grooved paddle, scored and fabric-impressed. The cord-wrapped rod decorative technique was the major technique (77 of 149 rim and neck sherds), followed by cord-impressed (20), dentate (37), plain (6), incised (5), and pinched (4) (Wettlaufer and Mayer-Oakes 1960: 29). Faunal remains were represented by the following minimum number of animals: bison (1), skunk (2), swift fox (1), dog (3), canid (3), beaver (2), snowshoe hare (1), pocket gopher (1), and ground squirrel (1) (Wettlaufer and Mayer-Oakes 1960: 88-89).

At the Long Creek Site, two circular structure pits, approximately 12 feet in diameter, although not excavated, were considered to be associated with the Mortlach Complex (Wettlaufer and Mayer-Oakes 1960: 36). These were somewhat smaller than the Stutsman Complex, Hintz Creek Site structures which were 16.0, 26.4, 25.1, and 23.4 feet in diameter (Wheeler 1963: 178-186).

Mortlach stamped ceramics were found primarily in Level 2 of the Morkin Site, southern Alberta, which was assigned to the Cluny Complex of Period III (Byrne 1973). Since Byrne's Cluny Complex contained numerous attributes that were not contained within the other samples of the Mortlach Complex, the distribution of the two can not be considered synonymous; on a classificatory basis, the Mortlach Complex will be considered part of the Cluny Horizon. Other sites with a sample of Mortlach check-stamped ware included the Cluny Earth Lodge Site (Forbis and Huscher 1961; Forbis 1970), the upper levels of the Walter Felt Site and Big Beaver Midden (Kehoe and Kehoe 1968: 33-34), the Stoney Beach Site (Orchard 1946; Griffin 1963) and the shore of Oak Lake in Southwestern Manitoba (Loveridge 1974). Hodges (1967) reported a reconstructed vessel sharing the dentate stamped decoration on the bevelled rim from the vicinity of Eastend, southwestern Saskatchewan, and has vessels with the same decoration from a number of sites in central Saskatchewan near Regina; a number of these sites with the Mortlach materials also yielded early brass cartridge shells (Hodges 1973: personal communication).

All temporal evidence implies a late time period. The presence of small quantities of historic materials from the Shippee Canyon, Long Creek, and Mortlach sites, the presence of brass cartridges at other sites yielding Mortlach check-stamped pottery, and a date of A.D. 1700± 95 (GX-2055) from the stratum bearing most of the check-stamped pottery at the Morkin Site (Byrne 1973: 618) all point to the protohistoric and early historic period.

The Mortlach Complex is confined primarily to southern Saskatchewan and northern Montana with an occasional site in other regions such as the Cherry Point Site in Southwestern Manitoba. The southern boundaries are less clear. Wood (1971b) reported a vessel with check-stamping and horizontal dentate stamping on the rim from northwestern South Dakota, and similar materials have been found at the Hagen Site in eastern Montana (Mulloy 1942).

The combination of check-stamped surface finish and dentate stamping had a much smaller distribution than check-stamping without the accompanying dentate stamp decoration. Neuman's (1963) synthesis of check-stamped pottery demonstrated that it has been found in varying frequencies throughout the Northeastern and Central Plains. However, it appeared to be most common, both in number of sites and frequency per site, in the Knife-Heart Region of North Dakota. It first occurred during the Initial Coalescent (A.D. 1400 to 1550) and persisted into the historic period. Bowers identified check-stamping as an important trait of his Painted Wood Focus; this focus has been assigned subsequently to the Heart River Phase of the Post-Contact Coalescent Variant (A.D. 1675-1780) (Lehmer 1971). The Heart River Phase has been assigned to the Mandan-Hidatsa village groups, although Bowers believed that check-stamping was a trait introduced when the Hidatsa-Crow entered the Plains from Minnesota (Neuman 1963: 25). Current research in Minnesota has not substantiated a Minnesota ancestry and the eastern North Dakota sites that have yielded check-stamping, such as the Stutsman Complex, lacked dentate stamping and contained numerous ceramic types with cord-impressed S-rims and broad-trailed designs that were absent in the Mortlach Complex.

Selkirk Horizon Ceramics

Other late ceramics in Saskatchewan included vessels with woven bag impressions that fell within the range of variations for Selkirk Ware. Among these are the materials from the François Le Blanc (also referred to as François-Finley) Trading Post (Kehoe, A. 1964). This material should be assigned to the Clearwater Lake Punctate Complex. This surface finish was identical to that found on vessels from sites dating as early as A.D. 1000; I disagree with the identification of the impression as that of European manufactured wool cloth.

Woven fabric surface finish has also been found on ceramics from upper levels at the Gull Lake Site (Kehoe 1973: 119-125). The sample was too small to make any generalizations. One of the vessels from this level, that was excavated and reconstructed by John Hodges, had the perpendicular and herringbone incising along the lip top separated into quadrants by four tabs with three incised lines perpendicular to the lip; this lip design was very similar to many of the vessels of the Devil's Lake-Sourisford Burial Complex. This component has been estimated to date circa A.D. 1700 because it was found in the upper levels and because a scapula was found in the layer above with a hole purportedly caused by a 32 calibre bullet. However, no historic artifacts were found in association with the ceramics, so the estimate may be somewhat too recent.

Ceramic collections from the Stoney Beach and Last Mountain House sites also contained pottery identified as being the same as Winnipeg Fabric-Impressed materials of the Selkirk Horizon (Griffin 1965: 233-234; Orchard 1946: Plate 33, 36). These collections were based on samples pillaged from the sites; the only systemically excavated materials have not yet been reported. Orchard's illustrations show only a general similarity with the Gull Lake materials or much of the Manitoba materials. Subsequent analysis will be required to determine if they were temporal or geographical variations of related complexes.

Isolated reconstructed vessels from Saskatchewan provide limited information but imply that there are many undefined complexes present (Orchard 1946: Plates 33, 35, 36, 36-A; Hodges 1967, 1968). To assign these vessels to any complex would be premature.

Saskatchewan Basin Sequence of Alberta

An understanding and appreciation of the complexity of Alberta ceramics has emerged only recently. Prior to the latter half of the 1960's, knowledge of Alberta ceramics was confined to descriptive statements on small samples from the Ross Site and Grassy Lake Cairn (Forbis 1960, 1970), Old Women's Buffalo Jump (Forbis 1962), the Cluny Earthlodge Village (Forbis and Huscher 1961; Forbis 1968, 1970) and a brief description of some small surface samples (Griffin 1965). The recent work by Byrne (1973) has demonstrated that the significance of ceramics, particularly in southern Alberta, has been underrated. He established that there was a long tradition of ceramic-producing populations and that the distribution of ceramic sites was widespread in southern Alberta. On the basis of several occupations from the stratified Morkin Site, a Saskatchewan Basin Complex was defined for southern Alberta. This complex was sub-divided into a Period I Early Variant, estimated to date A.D. 150 or 250 to A.D. 1150, and a Period II and III Late Variant, A.D. 1150 to A.D. 1700 and A.D. 1700 to A.D. 1870 respectively. Cross-dating of sites, many of which had a collapsed stratigraphy, was based upon projectile points or the presence or absence of historic trade goods. Period I sites were identified on the basis of Avonlea points and possibly some side-notched and Besant points, Period II sites were identified on the basis of side-notched points, and Period III sites were identified on the basis of side-notched points and historic items (Byrne 1973: 298). Eighteen sites were assigned to these periods primarily according to these criteria.

Cluny Complex

A second complex, the Cluny Complex was defined as an intrusive, protohistoric manifestation. Temporally, it was assigned to Period III. The ceramics from the Alberta sites were analyzed according to changing modal frequencies. Despite the repeated references to mixture of materials across levels at the Morkin Site (Byrne 1973: 259, 286), the ceramics were analyzed as if they were unmixed. Since the report was based upon a modal analysis and few types were illustrated, comparisons are difficult to make. Nevertheless, the report did show that southern Alberta had considerable ceramic variability and a large number of ceramic components. The Cluny Earthlodge Site appeared to be a good example of the Cluny Horizon with a predominance of S-rims, simple stamping, dentate stamping, and braced rim traits (Forbis and Huscher 1961; Forbis 1970: 22-25; Byrne 1973).

The Ross Site and nearby Grassy Lake Cairn contained Late Woodland pottery (Forbis 1960: 122-126, Plate 7; Griffin 1965: 227-233). The sherds from the Cairn were essentially a surface sample. Those from the Ross Site came primarily from the uppermost layer of a three-component site. No dates are available for the Ross components, but they lacked historic items.

The Ross Site sherds represented a localized, Late Woodland development that shared only the most general characteristics with the Northeastern Plains. The surface finish was predominantly vertically cord-marked although one vessel had a closely woven fabric impression like the Winnipeg Fabric-Impressed Ware of the Selkirk Horizon. Minimal decoration consisted of rows of broad, shallow tool incisions on filleted bands at the lip exterior and on the rim (Forbis 1960: Plate VII 2-3; Griffin 1965: Figure 87).

No dates were obtained from the Ross Site and Forbis estimated dates of A.D. 1400 or 1500 for Layer I and A.D. 1500 or 1600 for Layer III. On the basis of ceramic traits, Forbis' guess may be very close. The vertical fabric may have dated as early as the A.D. 700-800 spread of the Blackduck Horizon onto the Plains, the Winnipeg Fabric-Impressed vessel may post-date A.D. 1000, the appearance of the Selkirk Horizon, and filleted rims appeared frequently on Terminal Middle Missouri pottery (Lehmer 1971: 123) dating to A.D. 1550-1675.

The Grassy Lake Cairn materials can not be correlated with any particular ceramic complex since the artifact sample must be treated as a surface sample and could represent numerous visits by a number of groups. The ceramic sample included vessels very similar to the Ross Site, a sherd with check-stamped surface finish, a sherd with fingernail-impressed decoration, and sherds with both smooth and obliterated fabric surface finish (Forbis 1960: 125-126, 161; Griffin 1965: 227-228).

The Morkin Site sample demonstrated some inconsistencies compared to developments on the Northeastern Plains. Whether these differences reflected the degree of site disturbance or different developments remains to be substantiated. Class I, with its vertical rims, deeply impressed knotted cord (netting) and single row of interior punctates and exterior bosses (Byrne 1973: 75-77, Plates 3f, 17e) appeared similar to the early ceramic forms on the Northeastern and Northern Plains and may be similar particularly to Avonlea pottery, yet this class was found in Level 2 which had a predominance of side-notched projectiles and dates of approximately A.D. 700 and A.D. 1200. Class C is characterized by a closely woven fabric-net finish similar to the Winnipeg Fabric-Impressed Ware of the Selkirk Horizon and

Class D is a truncated (obliterated) form of the same; specimens similar to these classes were consistently found together, and found to be late in the Northeastern Plains and Southern Boreal Forest but the Morkin sample indicates that Class C was found in Levels 3 and 4 and most common in Level 3 while Class D was found in Levels 1 and 2.

Other classes were depositionally consistent. Classes A and B which represented vertically corded and truncated vertically corded surface finishes were confined to Level 2. Some of the specimens in this sample had the exterior lip notching, shoulder notching, and filleting similar to the decorated sherds from the Ross Site (Byrne 1973: Plates 5a-e, 8a, e, 9a, b). The date of A.D. 1700± 95 (GX-2055) (Byrne 1973: 253) associated with Level 2 places it in the historic period.

Byrne (1973: 335-338, Plates 18-20) identified a Cluny Complex which contained squat, globular vessels with S-rims or straight to slightly flaring rims, linear dentate stamping as the most common decorative technique followed by finger-pinched punctations and cord-wrapped stick impressions, and surface finish being either simple or check-stamped. The Cluny materials were found primarily in Level 2 of the Morkin Site. Its distribution includes ten localities in southern Alberta, all of which were located on the South Saskatchewan River or its tributaries (Byrne 1973: Figure 40). The Cluny Complex should be combined with the Mortlach Complex into a composite since they share many common traits, a comparable time period, and probably represent the same or closely related groups. This Mortlach-Cluny Composite may be combined into a single complex when detailed comparisons and samples are obtained from better contextual situations.

It is possible that the Cluny Complex represents the remains of the Crow after they had separated from the Hidatsa, but evidence is not conclusive (Forbis 1970: 22-25; Byrne 1973: 531-535). There are differences in the pottery between Cluny and Hagen and between Hagen and the materials found by Wood near Ludlow Cave. These differences may represent microevolutionary changes or the normal variation one could expect to find. More research is required in this area.

An overview of the complexes on the western Plains of Saskatchewan and Alberta provides a frustrating collection of "bits and pieces" consisting of isolated vessels or complexes with samples lacking adequate comparative data or questionable contextual control. The variability can not be accounted for by postulating interaction, trade, cultural choice or any other reason.

Three observations can be made:

a) There exists a ceramic record (Mortlach-Cluny Composite) that is protohistoric and historic and that is widespread, from Oak Lake in Southwestern Manitoba across southern Saskatchewan to southern Alberta;
b) The Selkirk Horizon spread into the Aspen Parkland and Plains of Saskatchewan. Since the Selkirk Horizon has been assigned to the Cree, and the Cree are known to have occupied Saskatchewan at least in the historic period, the presence of these ceramics substantiates the early historic and possible prehistoric presence of Cree in Saskatchewan;
c) There is limited evidence from the Gull Lake Site to support the extension of the early Blackduck Horizon into southwestern Saskatchewan. Given the seasonal movement of historic Plains hunters following the migratory bison, evidence of Blackduck materials in bison kills in the Plains and Aspen Parkland of southern Manitoba, Blackduck ceramics in bison kills, e.g., Gull Lake, of southern Saskatchewan are to be expected.

Summary

Prior to the archaeological research in Southwestern Manitoba in 1970, all ceramics and mounds had been assigned to a single archaeological manifestation, the Melita Focus. The data in chapter five demonstrated a complicated record of primarily Plains groups utilizing Southwestern Manitoba. The data for the Late Woodland Stage show that:

a) more than one group used Southwestern Manitoba during the Late Woodland Stage;
b) the groups who utilized Southwestern Manitoba came from the Boreal Forest, Upper Mississippi, and Northeastern Plains areas;
c) the changes that took place in Southwestern Manitoba were the result, at least in part, of population movements and increased horticultural activities; major changes were particularly evident circa A.D. 800 and 1400;
d) the archaeological record, to date, is a very conservative indication of the complexity that actually existed;
e) symbiotic relationships developed between populations in Southwestern Manitoba and the village tribes on the Missouri River.

As a result of excavations of new materials and a reassessment of previous materials there is direct evidence of:

a) the sudden appearance of Blackduck populations from the Boreal Forest and Conifer-Hardwood biomes circa A.D. 700 to 800;
b) the coexistence of the Snyder Dam I component during part of the Blackduck temporal range;
c) the presence of the Devil's Lake-Sourisford Burial Complex circa A.D. 1400 to 1600;
d) the Mortlach-Cluny Composite circa A.D. 1750;
e) six archaeological components that can not be assigned to other archaeological taxonomic units outside of the region have been excavated. These are discussed in the following chapter.

In addition to the above archaeological materials, there is evidence of the Arvilla Burial Complex and Extended Middle Missouri ceramics from south-central Manitoba that represent groups who probably also utilized Southwestern Manitoba. Their presence in close proximity to the region and the tendency for groups to be mobile and to cross two or more biomes on a seasonal basis provides a situation in which these groups would likely pass through Southwestern Manitoba. During the Late Woodland Stage, there were minimally ten and possibly more than a dozen different archaeological groups occupying Southwestern Manitoba. Of these ten, eight have been identified on the basis of recent excavations (Syms n.d.a, n.d.b, 1971, 1972, 1974a, 1974b, 1974e; Loveridge 1974).

The various archaeological complexes represent groups with different distributions and with developments from different biomes. The Blackduck Horizon represents the movement of Algonquian groups into the Aspen Parkland and Plains (Hypothesis 8 and 9) in terms of seasonal shift to bison hunting, migration of populations, or some combination of these activities. The Mortlach-Cluny Composite is a Northern Plains expression that may represent the Siouan-speaking Crow of the protohistoric and early historic periods. The Devil's Lake-Sourisford Burial Complex belongs to some prehistoric Northeastern Plains group. Other complexes have less certain distributions.

An understanding of Late Woodland developments can be attained only by being aware of changes taking place in the Boreal Forest, Upper Great Lakes, Upper Mississippian, Middle Mississippian, Northeastern Plains, and Northern Plains. Approximately A.D. 800, horticulture with a corn, beans and squash base, sedentary village life, regionalization of assemblages, movement of populations, and increased population density developed and spread to the north and west. Technological changes included a shift to globular vessels, small side-notched projectile points, and scapula hoes.

While some of these traits did not become part of the adaptive trends in Southwestern Manitoba, their appearance in nearby areas irrevocably altered the cultural history of Southwestern Manitoba. The establishment of sedentary villages along the Missouri River provided the foci for trade and created the variables for the symbiotic relationships between nomadic Plains hunter and village horticulturalist (Hypothesis 11) that persisted into the historic period (Holder 1970; Ray 1974).

Approximately A.D. 1400, major changes took place in the interrelationships between groups. Entire areas to the south of the Great Lakes became void of human populations, the Algonquian Blackduck Horizon diminished its territory and shifted eastward, the populations of the Mill Creek Complex left northwestern Iowa, the Middle Missouri area was reduced in population, and complexes of more nomadic groups appeared in the Northeastern Plains. Population movements result in increased conflict or the need to develop new alliances. The reduction in the number of sedentary villages may have reduced the hunter-horticulturalist interchange.

Clearly, any effort to understand the cultural history, environmental adaptations, and processes of change in Southwestern Manitoba or any region in the Northeastern Plains must involve a dynamic model of societal interaction across biomes. The presence or absence of sedentary villages affects the seasonal round and resource utilization of nomadic hunters. The co-existence of increased numbers of complexes creates increased potential for conflict between populations for the same resources, as developed between the Dakota and Ojibwa to the south of the Great Lakes in the historic period.

CHAPTER 7

CULTURAL DEVELOPMENTS IN SOUTHWESTERN MANITOBA

Cultural Developments: A Preliminary Overview

Introduction

The original problem was to explain the ceramic variability in Southwestern Manitoba. Efforts to solve this problem resulted in:

a) archaeological survey and excavations in the research region;
b) assessment of seasonal fluctuations in resource potential, within and beyond the research region;
c) assessment of ethnohistoric data on the utilization of the region and the development of the Co-Influence Sphere Model as a new perceptual framework with which to generate hypotheses and research problems;
d) survey, synthesis, and re-assessment of the archaeological record in the biomes and "culture areas" around the research region.

In progressing through these various steps, a series of postulates and hypotheses were generated (Table 9). Repeated references were made to new archaeological complexes discovered as a result of field research and the re-assessment of previous data due to comparisons of data with the archaeological record in nearby areas. This section brings together all of the new archaeological data in the research region with the hypotheses and postulates that were proposed.

The archaeological data are based primarily on excavated materials (Figure 23). However, selected data from surface sites are utilized when their identification is unequivocal. Data from outside of the region are incorporated in the discussions, but the emphasis is upon interpreting local cultural history (Figure 24), with the recognition that regional developments can be understood only by incorporating

TABLE 9

POSTULATES AND HYPOTHESES[a] RELATED TO THE UNDERSTANDING OF THE CULTURAL HISTORY OF SOUTHWESTERN MANITOBA

Postulate 1 (page 88)

The importance of the biophysical environment of a region can be understood only by comparing the resource potential of the region during any season against the resource potential of adjacent zones or areas.

Postulate 2 (page 102)

Native groups following a primarily traditional subsistence-settlement orientation were highly mobile and utilized two or more environments as core, secondary, and tertiary areas of intensity.

Postulate 3 (page 140)

Numerous groups co-existed in Southwestern Manitoba during the pre-reservation period.

Postulate 4 (page 141)

The geographical distribution of any major Native ethnic group whose homeland included part of the Northern Plains incorporated large tracts of environment that cross-cut two or more different environments.

Postulate 5 (page 144)

Southwestern Manitoba was utilized differently on a seasonal basis.

Postulate 6 (page 146)

Differences in tool kits or assemblages among groups in Southwestern Manitoba were primarily reflections of cultural variation rather than functional differences.

Postulate 7 (page 147)

The distribution of numerous groups represented a series of overlapping ranges.

Postulate 8 (page 148)

The movements of groups and/or changing resource potential created demographic vacuums.

[a] These are given in the order in which they were developed in the text.

Postulate 9 (page 158)

Trade networks were an essential part of the economic redistribution of resources.

Postulate 10 (page 162)

Most of the pottery was manufactured by women.

Postulate 11 (page 163)

Pottery manufacturing was part of a familial mode of production, i.e., women were expected to learn how to make pottery and the vessels were manufactured primarily, if not wholly, for use by the family group.

Postulate 12 (page 174)

Various ethnohistorical groups had ceramic technologies with distinctive traits of clay sources, tempering choice, manufacturing techniques, form, function, and firing techniques.

Postulate 13 (page 174)

Ceramics of the horticultural groups were more diversified than were the ceramics of the nomadic groups.

Postulate 14 (page 175)

Pottery manufacturing was a seasonal occupation for groups living in Southwestern Manitoba.

Hypothesis 1 (page 203)

The ceramic variability in Southwestern Manitoba represents the complexes of numerous co-existing groups during specific time periods as a result of evolutionary change in stylistic expressions and movements of populations.

Hypothesis 2 (page 232)

The Laurel Composite represented population movement and displacement into the Boreal Forest.

Hypothesis 3 (page 244)

During the Middle Woodland Stage, Southwestern Manitoba was utilized coevally by two different nomadic Plains groups whose remains have been identified as the Valley Complex and Sonota Complex.

Hypothesis 4 (page 260)

Southwestern Manitoba was utilized only by a number of nomadic Plains groups (complexes).

Hypothesis 5 (page 261)

The complexes that were recognized for Southwestern Manitoba overlapped temporally, geographically, and seasonally.

Hypothesis 6 (page 262)

Mobility was important for seasonal utilization within biomes and for trade across biomes but not as part of multi-biome resource utilization during the Middle Woodland Stage.

Hypothesis 7 (page 264)

The Plains complexes of the Middle Woodland Stage represented movements of populations onto the Plains.

Hypothesis 8 (page 288)

The Blackduck Horizon represented the relatively rapid movement of related groups throughout much of the Boreal Forest, Aspen Parkland of Manitoba and adjacent edge of the Plains.

Hypothesis 9 (289)

The Blackduck Horizon represented the material remains of several interrelated but autonomous Algonquian groups.

Hypothesis 10 (page 312)

During the late Woodland Stage in the Upper Mississippi Area, a series of archaeological complexes appeared which represented co-existing sedentary or semi-sedentary groups who shifted territories periodically.

Postulate 15 (page 334)

During the Late Woodland Stage, there were a series of migrations of populations into the Northeastern Plains both from the Upper Mississippian and Central Plains areas.

Postulate 16 (page 335)

The development of sedentary villages on the Northeastern Plains created the focal points for trade networks similar to those of the historic period.

Postulate 17 (page 336)

Population growth took place in the Northeastern Plains during the late Woodland Stage.

Hypothesis 11 (page 336)

The historic symbiotic relationships between nomads of the Northeastern Plains as a whole, and Southwestern Manitoba specifically, and the Middle Missouri villages developed early in the Late Woodland Stage.

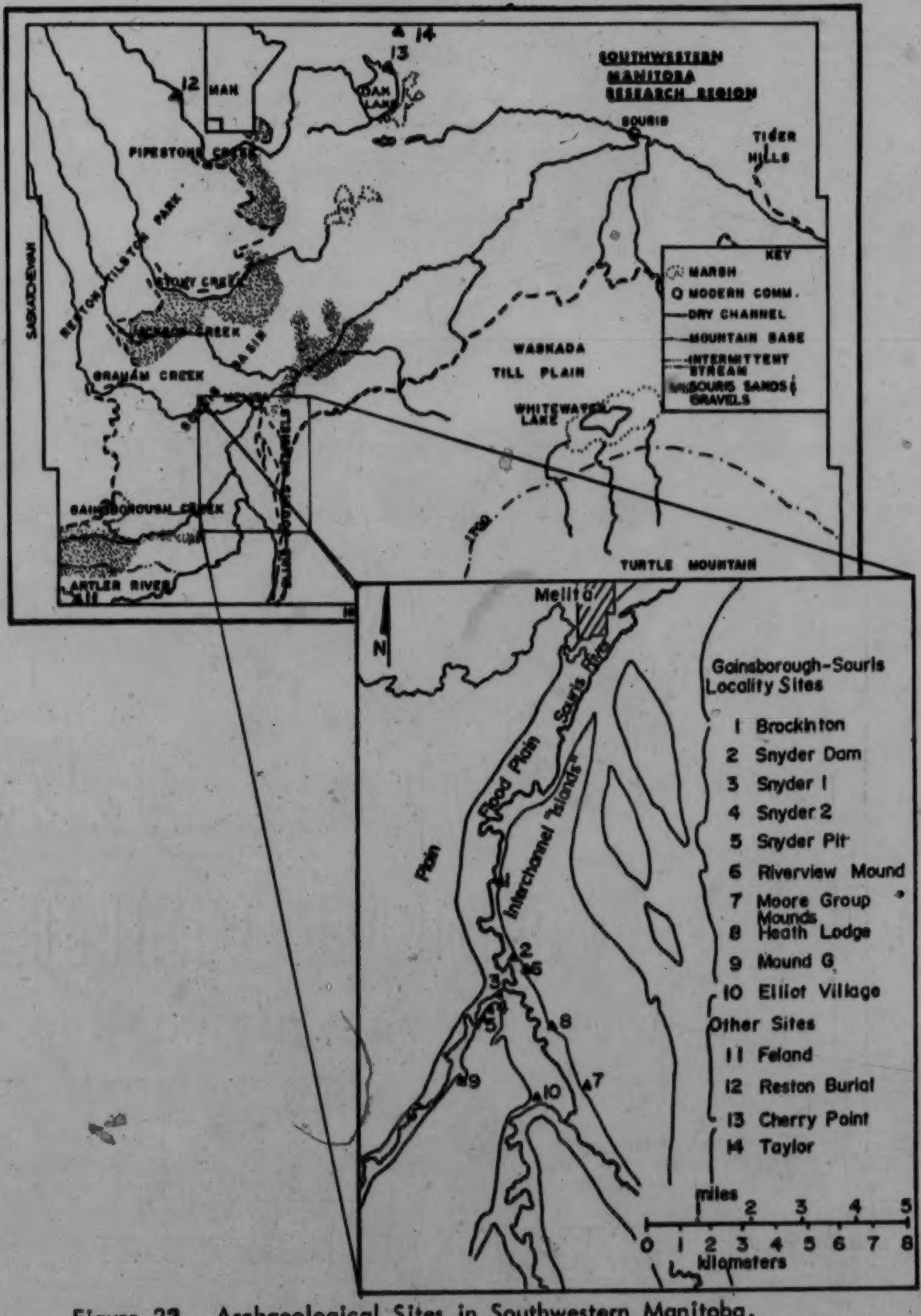
SOUTHWESTERN MANITOBA RESEARCH REGION
MAN
12
13
14
OAK LAKE
SOURIS
TIGER HILLS
PIPESTONE CREEK
RESTON-TILSTON PARK
STONY CREEK
SASKATCHEWAN
GRAHAM CREEK
BASIN
WASKADA TILL PLAIN
WHITEWATER LAKE
GAINSBOROUGH CREEK
ANTLER RIVER
11
TURTLE MOUNTAIN
KEY
MARSH
MODERN COMM.
DRY CHANNEL
MOUNTAIN BASE
INTERMITTENT STREAM
SOURIS SANDS & GRAVELS
N
Melita
Souris River
Flood Plain
Interchannel "islands"
Plain
Gainsborough-Souris Locality Sites
1 Brockinton
2 Snyder Dam
3 Snyder 1
4 Snyder 2
5 Snyder Pit
6 Riverview Mound
7 Moore Group Mounds
8 Heath Lodge
9 Mound G
10 Elliot Village
Other Sites
11 Feland
12 Reston Burial
13 Cherry Point
14 Taylor
miles
1 2 3 4 5
0 1 2 3 4 5 6 7 8
kilometers

Figure 23. Archaeological Sites in Southwestern Manitoba.
A) Research Region, B) Gainsborough Creek Drainage and Gainsborough Creek-Souris Locality.

SCHEMATIC PRESENTATION OF CERAMIC CULTURAL HISTORY OF SOUTHWESTERN MANITOBA IN RELATIONSHIP TO DEVELOPMENTS IN NEAR-BY AREAS

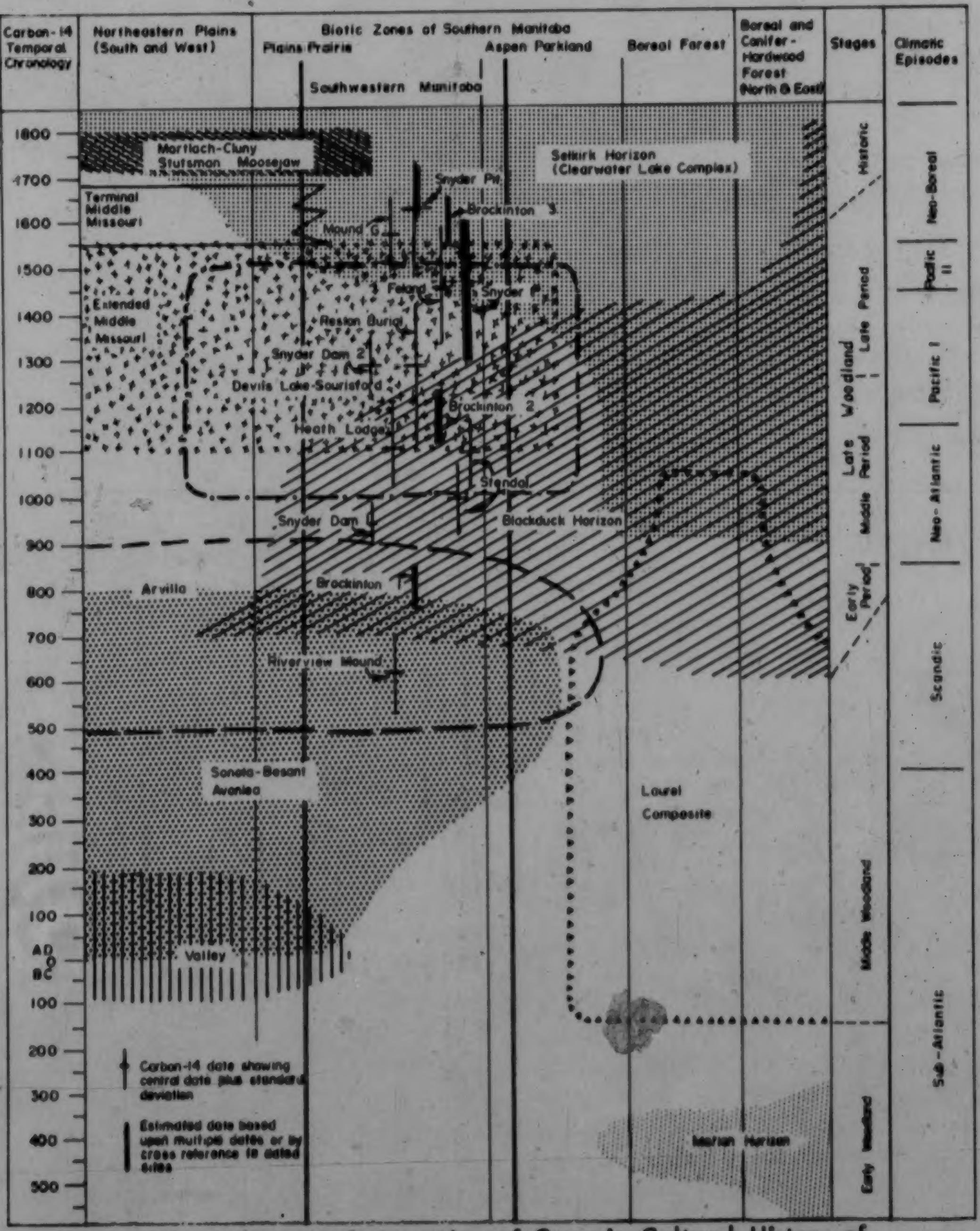

Figure 24. Schematic Presentation of Ceramic Cultural History of Southwestern Manitoba in Relation to General Developments of Nearby Areas.

the data within the general developments of surrounding areas.

Early Woodland Stage (1000 B.C.-100 B.C.)

To date there has been no evidence of Early Woodland occupations in Southwestern Manitoba nor the remainder of the Northern Plains. While it is unlikely that the ceramic variation in Southwestern Manitoba was caused by the presence of Early Woodland hunters, it is necessary to be aware of the possible presence of small quantities of artifacts in sites and collections.

The nearest evidence is southeastern and central Minnesota where there are three known Early Woodland sites. The paucity of sites suggests that even Minnesota was a peripheral area of occupation for Early Woodland groups.

Evidence on resource utilization has been limited primarily to the Deciduous Forest zone of the Midwest Riverine area such as the Illinois and Ohio valleys and the Deciduous Forest and southern parts of the Mixed Conifer-Hardwood Forest south of the Upper Great Lakes. Sites were small with a diffuse economy in which there was no emphasis upon any particular resource. The summer and fall sites in the southern part of the Upper Great Lakes contained bird, fish, turtle, muskrat, beaver, and minute amounts of acorn, beech or hazel nut, grape, cherry or huckleberry, and squash. The winter sites contained small mammals, deer, and elk (Cleland 1966: 58-60; Fitting 1970: 90-95). The Illinois sites show that a variety of small mammals were hunted, and harvesting or collecting of plants such as marsh-elder, lamb's quarter, pigweed, knotweed, squash, and gourds were confined mainly to disturbed flood bank habitats (Struever and Vickery 1973).

Sites increased in numbers during the latter part of the Early Woodland Period. Most dates from Michigan, Ohio and Illinois fall within the beginning of the Sub-Atlantic Episode (550 B.C.-A.D. 400). Expansion was widespread circa 600-500 B.C., at which time Early Woodland groups may have penetrated the southern parts of Manitoba.

Manitoba would, therefore, have been a peripheral area, and sites would have been sporadically occupied according to the general pattern of nomadic, shifting economic activities in a tertiary region.

Identification of Early Woodland components required vessel reconstruction, textile impression analysis and carbon-14 dates. Samll straight-walled rim sherds of wide to medium thickness, circa 15-18 mm, could be mis-identified easily as part of some of the Late Woodland components. Vessel form and surface finish were crucial traits. Accompanying artifacts included medium-sized straight or expanding stemmed projectiles, numerous drills, scrapers, and worked flakes.

Data from the Cherry Point Site, the only excavated Archaic site in the region, show that Archaic hunters occupied the region intermittantly from approximately 900 B.C. to A.D. 900 and were using Oak Lake as a seasonal bison kill (Haug 1976). Some evidence of mixture of Early Woodland and Archaic assemblages may be present due to the interaction of co-existing groups and/or collapsed stratigraphy.

Middle Woodland Stage (100 B.C.-A.D. 900)

By the beginning of the Middle Woodland Stage we find the first perceptible evidence that the culture history of Southwestern Manitoba was being influenced indirectly by developments taking place in the Upper Great Lakes and Boreal Forest to the north and east, and directly by developments on the plains to the south and west. To the east, the southern Boreal Forest, Conifer-Hardwood Forest and Aspen Parkland were being utilized by groups belonging to the Laurel Horizon and the Northern Lake Forest Configuration. In Manitoba, however, there was a primary reliance upon the Boreal Forest by groups of the Laurel Horizon with very little utilization of the Aspen Parkland. Even the utilization of the Boreal Forest in Manitoba may have been seasonal during at least part of the Middle Woodland Stage because:

a) sites were confined primarily to the Boreal Forest which would require surviving on limited, undependable resources during the winter;
b) the limited faunal identification from sites in the Rat-Burntwood Region suggest non-winter utilization;
c) burial mounds are confined to the Upper Great Lakes and riverine system along the Minnesota-Ontario border;
d) sites tend to be located along rivers and marshy lake outlets where fish and summer resources were most plentiful.

There is no evidence for large sites, sites based upon seasonal utilization of bison (analogous to the western Cree), or of large summer fishing villages like those of the Middle Woodland sites south of the Great Lakes. Large sites, if they existed, might be expected in the ricing regions of northern Minnesota and western Ontario where there was a stable, seasonally intensive resource. This latter region has the greatest concentration of mounds. These may have been accumulative mounds in which groups returned annually to add individuals and layers of earth.

Laurel Horizon dates span approximately 100 B.C. to A.D. 1100, but most fall within the A.D. 200-800 range. The later dates are confined to western

Ontario and northern Manitoba where Laurel sites may represent peripheral lag because these late dates are confined to the northern peripheries.

The complexes within the Laurel Horizon were at least peripherally involved in various exchange networks. Evidence of copper and certain Hopewellian items such as platform pipes reflect direct or indirect contact with the Upper Great Lakes and Hopewellian groups south of the Great Lakes. The presence of Knife River flint in Laurel sites substantiates direct or indirect contact with western North Dakota. The importance of Knife River flint can not be determined because few reports quantify the kinds of lithics; however, intrusive Laurel ceramics into McKean levels at the Cemetery Point Site in the Winnipeg River Region were associated with Knife River flint (Syms 1969: 65-68).

The Laurel sites north and west of the Upper Great Lakes tend to be small, which implies occupation by small family and multiple-family units. Exogamous, patrilocal bands have been postulated (Wright 1971; Brose 1970: 165-168). Such a model of social organization is much too simplistic as shown by the results of two conferences on the cultural ecology of bands (Damas 1969a, 1969b). Alternatives such as bilateral preferences, band fluidity, and adaptability require that archaeologists must seek evidence from the artifacts to substantiate interpretations on residence rules.

In contrast to the evidence of limited, peripheral use of Southwestern Manitoba by Boreal Forest populations, the record of Plains complexes provides evidence that several different nomadic groups appeared on the Northern and Northeastern Plains and utilized Southwestern Manitoba on a seasonal basis (Hypotheses 3, 4, 5, 6). There is evidence of at least three and possibly six complexes: Sonota, Besant, Snyder Dam 1, Valley, Avonlea, and the Riverview Mound; only the Riverview Mound was reported prior to the current research program and it had been lumped with all other mounds and ceramics into a single Late Woodland focus. At least two different subsistence emphases are suggested by the evidence from the Sonota and Valley complexes.

Hypothesis 12

> The Sonota Complex subsistence adaptation in Southwestern Manitoba consisted of a series of spring and autumn bison kills by small scale nomadic hunting societies.

Bison were the economic focus on at least a seasonal basis for the Sonota-Besant complexes (Reeves 1970a, 1970b; Gruhn 1971; Kehoe 1974; Neuman 1975). The dependence upon bison is also reflected in its importance in ritual activities associated with death. Given the seasonal migration of bison, the late autumn, winter, and early spring sites would have been in the Aspen Parkland, the autumn and spring sites along the edge of the Plains, and the summer sites to the west on the High Plains.

The Sonota Complex is represented by large sites in the Aspen Parkland, a short distance to the east, and by occasional specimens of projectile points from sites within the research region. Since the Sonota Complex had a widespread distribution over the Northern Plains and since the sites in Manitoba contain large quantities of non-local lithics, it is apparent that southern Manitoba fell within the Sonota core area. Sites further to the west probably represented secondary activities or intermittent trading trips. The core area of the Sonota Complex included northern South Dakota, western and central North Dakota, and southern Manitoba. The distribution of all known Sonota sites in the Aspen Parkland of

Manitoba is indicative of fall or winter settlements.

Evidence on habitations is inferred from a few transitory structures on the Central and Northeastern Plains consisting of circular or ovoid structures utilizing a small pole framework (Kivett 1952; Wilmeth 1972). There is no evidence of large, seasonal permanent structures such as the earth lodge for any of the Early Ceramic Plains Village Configuration.

At present, the relationship between Sonota and Besant is unresolved. They may reflect seasonal differences, different complexes with different geographical ranges, or other alternatives. Given the differences in raw materials, projectile point size, absence of certain categories of tools such as long awls, and absence of mounds with Besant sites, it is likely that different complexes will be recognized for Sonota and Besant materials. Besant materials have been associated with a number of bison sites on the Northern Plains (Reeves 1970a; Byrne 1973), so the seasonal utilization of Southwestern Manitoba would appear to be similar to that of the Sonota Complex.

Valley materials appear to be sparse and represent only intermittent occupation of the region by groups who normally utilized the Northeastern Plains more intensively to the south. Only one Valley vessel has been reported from Southwestern Manitoba (Syms 1971a). However, Valley materials lack the distinctive raw material association of Sonota sites, and are characterized by barbed and unbarbed corner-notched projectiles which may be confused with Archaic forms. The paucity of reported sites may reflect a sampling bias because the ceramics are not readily recognizable from minute rim sherds and can be recognized only from large reconstructed sections that show rim profile and textile impressions.

Avonlea sites have been found primarily to the west of the research region, but the presence of a few Avonlea projectiles in local collections suggests the research region was used occasionally by Avonlea groups. The sites at The Pas and Avery may represent winter camps in the Aspen Parkland. Since Avonlea sites are far more numerous to the west on the Northwestern Plains (Reeves 1970a) and since Knife River flint was used only in small quantities (Johnson and Roper 1974), it appears that Avonlea hunters rarely frequented the Northeastern Plains and did not include the Knife River flint quarries within their geographical range.

Burial mounds are associated with both the Sonota and Valley complexes. On the basis of the accompanying burial goods, it is evident that the groups were interacting to various degrees with the Hopewellian trade network. Sonota burials are mass interments of groups of secondary bundle burials, suggesting practices analogous to the Feast of the Dead ceremony among the Huron. Only one Valley burial, the Taylor Mound (O'Brien 1971), implied possible status differentiation like that found in the Illinois and Ohio Hopewellian tomb burials.

The Snyder Dam 1 component along the Souris River revealed that there were additional complexes to be defined and assigned to the Early Ceramic Plains Village Configuration or to some transitional development between early and late ceramic sites. At present it serves mainly to denote the complexity of the cultural history of the Northeastern Plains.

The Riverview Mound near the confluence of Gainsborough Creek and Souris River was excavated by Nickerson and dated by Wilmeth (Capes 1963: 37-39; Wilmeth 1970: personal communication). The radiocarbon date of 1330±90 B.P. (Gak-1883) or A.D. 620±90 dated the wood poles covering the burial pit.

Artifacts associated with the burial pit were one incised bison rib and a bone tube the size and shape of a shotgun shell (Capes 1963: 37-38). Due to lack of sufficient diagnostic artifacts, it was not assigned to any complex.

Much of the evidence for distinguishing the various Plains complexes of the Middle Woodland Stage relies upon vessel reconstruction, surface finish analysis, and comparison of projectile point forms with respect to minor variations in a variety of deep and shallow corner-notched forms. To date, none of these traits has been analyzed adequately and most reports have provided inadequate data for effective comparison. Pottery was utilitarian and lacked the elaborate decoration and zoning of Hopewellian vessels. Vessels were conical to conoidal with straight to slightly flaring walls.

Dates for Middle Woodland Stage complexes suggest considerable overlap as well as lack of agreement among researchers. The total range for most complexes was 100 B.C. to A.D. 900. The Valley Complex was probably early, circa 100 B.C. to A.D. 200. The Sonota, Besant and Avonlea complexes dated approximately A.D. 1 to A.D. 800. The Snyder Dam 1 component was approximately A.D. 900.

There is little evidence to support an environmental cause for expansion onto the Plains. Floodplain horticulture may have been important for the development of Kansas City Hopewell on the Central Plains and the intensive utilization of plant resources, but the Northeastern Plains were occupied by nomadic groups relying primarily upon the bison.

Ceramics associated with both the Laurel Horizon and the Early Ceramic Plains Village Configuration have been compared to Hopewellian developments because they share a conical to conoidal vessel shape with little or no neck constriction, and are frequently decorated with a single row of punctates. In other respects, however, the ceramics are very different. Laurel ceramics are smooth, coil-made vessels with a variety of decorative techniques such as pseudo-scallop shell, dentate stamping, linear incising, and push-and-pull stamping and a conical shape with a maximum bulge below the lip. The Plains ceramics are rarely smoothed, generally covered with a fabric or netting which may reflect a fabric mold, conical to conoidal, and straight-walled or slightly flared in the lower two-thirds of the vessel. Traits associated with manufacture, decoration, and form distinguish Plains ceramics from Laurel ceramics. The variation within the Plains ceramics is primarily surface finish, slight variations in vessel form, and decorative variation.

The cultural record of the Middle Woodland Stage in Southwestern Manitoba proves that the Co-Influence Sphere Model applies as early as 2,000 years ago. There is no evidence, though, that any systematic relationship existed between Boreal Forest and Plains groups.

Both the Boreal Forest and Plains groups were small scale, nomadic hunters. Differences in resource utilization had emerged in that the Boreal Forest hunters occupied small temporary camp sites with no evidence of intensive resource utilization except in the Conifer-Hardwood Forest around the Upper Great Lakes. Most of the Plains groups had adapted themselves to the seasonal emphasis upon the resource intensive bison. Since both Boreal Forest and Plains groups were hunters subsisting primarily on a variety of game animals, it was advantageous to develop symbiotic relationships for the exchange of subsistence resources.

Late Woodland Stage (A.D. 600 - 1800)

During the Late Woodland Stage, horticulture, sedentary life, and increased complexity of social organization represented important changes on the eastern Plains. This stage overlaps temporally with the previous stage. For purposes of analysis, it has been divided here into four periods--the Early Period *circa* A.D. 600-900 (latter parf of the Scandic Episode), the Middle Period *circa* A.D. 900-1200 (the Neo-Atlantic Episode), the Late Period *circa* A.D. 1200-1675, and the Early Historic Period *circa* A.D. 1675-1800.

Early Period (A.D. 600-900)

During the Early Period, Mississippian traits appeared in the Middle Mississippian Area, and the ancestral populations responsible for numerous sedentary complexes in the Upper Mississippi, Central Plains and Northeastern Plains areas developed as separate identities (Gibbon 1974; Hurley 1974; Lehmer 1971; Krause 1970). These complexes are the result of migrations of Mississippian populations, Woodland peoples adopting new Mississippian skills and traits, or some combination of the two. Both the archaeological and biological data are inconclusive on the generic relationships between some of the complexes.

New forms of corn, intensification of horticulture, and replacement of the previous mud flat techniques with new garden techniques provided a more stable resource base. Sedentary horticulture settlements became the nuclei for trade networks, as nomadic hunters and gatherers traded items for domesticated foods. Since these food items were highly perishable, much of the direct archaeological evidence has been lost.

In Southwestern Manitoba, this Early Period is characterized by the persistence of Middle Woodland complexes such as Sonota, the existence of the Snyder Dam 1 Complex, and the sudden appearance of new complexes from the Boreal Forest, Upper Mississippian and Northeastern Plains areas. The appearance of these new complexes represents the movements of populations (Hypotheses 8 and 10).

The Blackduck Horizon emerged suddenly circa A.D. 700-800 and spread rapidly throughout the Boreal Forest and Conifer-Hardwood Forest, north and west of the Upper Great Lakes, into the forests, Aspen Parkland, and Plains. No single cause for this expansion across many biomes has been determined. Both environmental and cultural processes could have been involved.

Possible environmental factors include:

a) warmer winters enabling the bison to stay out on the Plains and requiring hunters to shift to the Plains during the winter;
b) a shift to bison as a seasonally intensive resource on a regular basis with occasional forays onto the Plains due a); and
c) a shift westward by groups in response to systematic exchanges of food resources across multiple biomes, particularly with respect to exchanges with sedentary groups to the south.

Present data are insufficient to select any one of these alternatives over any other. Cultural variables such as conflict or population pressure are other possible alternatives. The increased frequency and sizes of sites in regions around the Upper Great Lakes (Fitting 1970: 143) provides indirect evidence of potential conflict in the Conifer-Hardwood Forest of the Upper Great Lakes as greater numbers of groups compete for the same resources.

Unlike the previous Laurel Composite, the Blackduck Horizon sites are more numerous in the Boreal Forest and Aspen Parkland and occur frequently on the Plains. Furthermore, large sites such as the Stott Site suggest that larger groups were present. Blackduck burial mounds have been found in the Aspen Parkland and Plains rather than the very restricted distribution of Laurel mounds.

In Southwestern Manitoba, initial research efforts yielded considerable evidence of occupation by Blackduck groups. Occupation 2 of the Brockinton Site is a Blackduck component (Syms 1971a, 1972, n.d.b). At the Oak Lake Locality, Blackduck vessels were found in the Cherry Point excavations and from the Taylor Site to the north (Syms 1974c). Blackduck sherds were found at the Elliot Village Site and in Nickerson's test excavations on the Gainsborough Creek floodplain (Capes 1963). Several local collections from various sites along and near the Souris River and Gainsborough Creek also contain Blackduck Horizon sherds.

As the groups responsible for the Blackduck Horizon shifted from the Boreal Forest to the Plains, they underwent a gradual shift from a diffuse Woodland economy to a transitional Woodland-Plains economy to a resource intensive utilization of the bison. This gradual transition can be recognized in the limited number of "pure" Blackduck sites from Ontario, northern Minnesota, and western Manitoba. The faunal remains from sites in Ontario and northern Minnesota consist of diffuse resources such as birds, fish, deer, bear, beaver, moose, and possibly elk (Burns 1974; Lugenbeal 1975: personal communication). The Stott Site in the Aspen Parkland along the Assiniboine River Valley is primarily an autumn bison kill but contains animals such as deer, bear, lynx, skunk, porcupine and squirrel which are found along the wooded valley (Bird 1947). In Southwestern Manitoba, Blackduck materials are found with two bison kills (Syms 1972; 1974c; Haug 1976). The Cherry Point component was either a spring or autumn site and the Brockinton component was an autumn, winter or spring camp.

Since Arvilla mounds have been identified in the Red River and Pembina Valley regions to the east and the Assiniboine Valley to the north of the research region, and since a number of mounds in Southwestern Manitoba contain some Arvilla traits such as *Natica* beads, shell tubular beads, and shell gorgets, it is likely that Arvilla habitations occurred in and near the research region (Capes 1963; Johnson 1973). The temporal and partial geographical co-existence of the Arvilla Burial Complex and the Blackduck Horizon (Figure 22), the presence of a Blackduck vessel in one Arvilla mound, and the sharing of certain traits such as unilateral barbed harpoons, provides evidence of contact. The dynamics of the interchange, i.e., whether there was trade or population exchange, can not be ascertained at present.

Occupation 1, the earliest component at the Brockinton Site, was a bison kill dating approximately A.D. 800 (Syms 1971a, 1972, n.d.b). Only two excavation units were placed in the habitation area of the site, and the sample of ceramics was not adequate to define a ceramic technology or relate it to ceramics within or beyond the research region. This occupation is assigned to the Late Woodland Stage on the basis of numerous Prairie Side-notched projectile points and the date.

The Early Period of the Late Woodland Stage is represented by remnant populations of Archaic, Oxbow hunters, the persistence of Middle Woodland groups and the sudden appearance of groups from the Boreal Forest and Upper Mississippian areas. Both temporal and geographical overlap is evident. This overlap by several groups who attempted to utilize the same biophysical environment according to a similar seasonal cycle of exploitation increased the pressures on the available resources and created the potential of increased conflict. In later periods, groups developed symbiotic relationships with village tribes on the Missouri River. The increased demographic pressure on the local resources may have required similar adjustments with villages in southwestern Minnesota, northwestern Iowa, and possibly the eastern Dakotas. Future research should be directed towards testing for data on this symbiotic relationship.

Middle Period A.D. 900-1200

During the Middle Period, A.D. 900-1200, villages continued to develop and expand. Upper Mississippian centres such as Bryan and Silvernale appeared in the Prairie Peninsula of southern Minnesota, and satellite Middle Mississippian centres such as Aztalan emerged in the Upper Mississippian Area. These centres may have been satellite nodes or trade centres (Watrall 1974).

Villages of rectangular earthlodges, sometimes fortified, appeared in northern Iowa and in the Middle Missouri Sub-Area. The expansion of these horticultural villages has been attributed, at least in part, to the ameliorating climate of the Neo-Atlantic Episode with its increased warmth, reduced dry westerly winds, and increased moisture on the eastern Plains (Lehmer 1970, 1971).

The Neo-Atlantic Climatic Episode (A.D. 900-1200) was an ideal time for the expansion of horticultural villages into Southwestern Manitoba and nearby areas. As discussed previously in Chapter 2, the average frost-free period in southern Manitoba today is adequate for growing corn. Increased warmth and rainfall during the Neo-Atlantic Episode would have reduced the length of the required growing season and reduced the dangers of occasional crop loss due to frost. No earthlodge sites have been identified or excavated to date, but there are two lines of evidence to suggest that Plains horticultural villages may have existed in and near Southwestern Manitoba.

The evidence is based on:

a) Middle Missouri sherds in the Pembina Valley and Southwestern Manitoba regions;
b) the fact that the Extended Middle Missouri variant was concentrated in the northern area of the Middle Missouri sub-area and originated there (Lehmer 1971: 99);
c) oral traditions of the Mandan and Hidatsa include accounts of living north of North Dakota.

The oral traditions are quite specific about former locations in southern Manitoba as illustrated in the following Mandan account.

> According to Wolf Chief's version. . . (Bowers 1950: pp. 156-163), the Mandan originated on the right bank of the Mississippi near the ocean, where they emerged from beneath the earth, bringing corn with them. Their chief was named Good Furred Robe. Moving North, they reached the mouth of the Mississippi River, where they found people living on the other bank in a large village. They could understand these people and considered them as Mandans. Continuing North until they reached the mouth of the Missouri River, they crossed to its north bank and resided there for a time. They then moved up the Mississippi, settling not far from the pipestone quarries in Minnesota. About this time one clan moved to a point north of the Turtle Mountains, "building villages along the way," where they remained until they later moved west to the Missouri River. The rest of the Mandan moved southward, settling another village with lodges of the "eagle trapping type with grass and dirt covering the sides." Not long after, the Mandan rediscovered the Missouri River, moved west, and built a village on the east bank opposite the mouth of the White River. At this time, the Awigaxa band vanished, and although some of them later returned, they talked differently. Under the continued direction of Good Furred Robe, the rest of the tribe moved north, where they joined the others whom Lone Man and First Creator had placed there. They continued to live in this vicinity until their discovery by European explorers. (Wood 1967: 10) (Emphasis mine).

The Amahami have a similar legend in which they lived along the stream in eastern North Dakota and western Minnesota and finally settled on the Missouri River. The Hidatsa separated from the Amahami, moved north into a land of cold and severe winters and later moved south to Devil's Lake, North Dakota (Wood 1967: 10). Since Devil's Lake is in the northeastern part of North Dakota, any occupation to the north would be in Manitoba, either in the Pembina Valley or Southwestern Manitoba regions.

The archaeological sources of data are samples of sherds from both the Pembina Valley and Southwestern Manitoba regions that have traits such as cord-impressed rims, S-shaped profiles, and elaborate patterns of alternating triangles filled with incised lines or cord impressions that are Middle Missouri traits (Capes 1963; Joyes 1969; Reid 1972). The Extended Middle Missouri Variant persisted from approximately A.D. 1100 to A.D. 1550. It can not be determined if Extended Middle Missouri groups occupied Southwestern Manitoba throughout that period or only occupied the region for a limited time and then continued to use the region seasonally for bison hunting. Given the mobility of bison and the importance of bison to Extended Middle Missouri populations, Southwestern Manitoba might have been utilized at least during the spring and fall for bison procurement after the groups had moved south.

Evidence of Extended Middle Missouri influences can be found in the shift to smooth, grooved paddle ceramic manufacturing techniques. According to Lehmer (1971: 70), "the earliest sites of the Plains Village tradition which contain simple stamped pottery are those of the Extended Middle Missouri Variant." The Reston burials which contained incised thunderbird and broken arrow designs were also accompanied by a large reconstructed body section of a vessel which had a grooved paddle or simple stamped finish (Braddell et al 1970; Syms and Heathcote n.d.). The date of A.D. 1285± 175 (Rutherford 1973) for the Reston burial places it within a time range of Extended Middle Missouri expansion in the north. This is not to imply that the Reston burials or accompanying ceramics represent the remains of Extended Middle Missouri Variant populations, but it does indicate that populations had been in contact with Extended Middle Missouri populations and had learned new techniques in ceramic technology. These burials are assigned to the Devil's Lake-Sourisford Burial Complex.

As has been previously discussed, the Devil's Lake-Sourisford Burial Complex appeared approximately A.D. 1000 and lasted until A.D. 1600. It can not be assigned to any population. Research is required to identify and describe the habitation sites that accompany the mounds which are numerous near the confluences of the Antler River and Gainsborough Creek with the Souris River in Southwestern Manitoba. Some have also been found in the Pembina River Valley. At least some of the linear mounds are associated with this burial complex.

The Heath Mound, located near the Souris River between the mouths of the Antler River and Gainsborough Creek, was excavated by Nickerson and dated by Wilmeth (Capes 1963: 39-41; Wilmeth 1970: personal communication). The Heath Mound was an earth-covered structure that had partially burned and collapsed. A two-foot wide ring of burned earth, with a diameter of fifteen feet, covered ash and oak poles having a three inch diameter. Nickerson assumed that the structure had been plastered and that a mound was subsequently built on the collapsed structure; a more likely alternative is that the mound is the result of weathering and levelling of a collapsed earth-covered structure. The only items found in the lodge were a split rib spatulate-shaped tool, a bone gouge, a few stone chips, a stake, and some rounded burned rocks. Due to the absence of diagnostic tools, the structure can not be assigned to any complex. The carbon-14 date on the wood was 850± 90 B.P. or A.D. 1100± 90 (Gak-1882). This mound is the only evidence of an earth-covered lodge that has been excavated and its presence implies structures of some permanence.

The problem of mound identification becomes increasingly more difficult as additional research demonstrates an increased temporal span for mound construction, increased variability in artifacts associated with the mounds, and increased numbers of alternative burial complexes from beyond the region to which the mounds can be assigned. The early research in the region produced evidence of approximately 42 mounds which were subsequently assigned to a single focus (Capes 1963; MacNeish 1958). During the summer of 1970, the number was increased to 89 (Syms 1971b). Nash (1972, 1973) recorded 72 mounds within a random sample of 36 sections over two summers. Mounds are densely distributed in parts of Southwestern Manitoba but many were "excavated" with little concern for systematic recording or concern for context and many either lack diagnostic tools or have not been excavated.

The Stendall Site[13] is a bison kill located along Pipestone Creek which flows into Oak Lake (Colwill 1973; Rushowick 1975). The data have not been published nor has a detailed study been made of the ceramics. However, the presence of small amounts of Blackduck pottery, and two radiocarbon dates of A.D. 985± 70 (S-786) and A.D. 1100± 75 (S-690), place the occupation or occupations within the Middle Period. Bison remains were most common but freshwater clam, fish, turtle, bird, Snowshoe Hare, White-tailed Jackrabbit, Richardson's Ground Squirrel, Thirteen-line Ground Squirrel, beaver, muskrat, dog, gray wolf, bear, striped skunk, pronghorn antelope, and swift fox were also present (Rushowick 1975: 29). This fauna represents a mixture of riverine, woodland and Plains species. In addition to a focal emphasis upon bison, small quantities of diffuse resources were utilized. Given the presence of freshwater clam, turtle, bison, and possibly Canada goose, the site was occupied in the autumn when the bison were returning and the riverine species were available.

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[13] The Stendal Site is approximately 5.5 km. north of the boundary of the research region but it is included here because of its proximity and because it is on the Pipestone Creek.

During the Middle Period, a new ceramic complex or complexes emerged in the Boreal Forest of northern and eastern Manitoba. The Selkirk Horizon, and its Clearwater Lake Punctate Complex, was present as a widespread phenonmenon and persisted into the historic period when it is identified as evidence of Cree activities. There is no evidence from excavated data that Selkirk Horizon was diffusing into Southwestern Manitoba.

The Middle Period represents a time of changing relationships with other areas. There is no evidence of continued occupation by groups who were primarily involved with the Northwestern Plains. The presence of probable Extended Middle Missouri sites, Devil's Lake-Sourisford mounds, and the Heath lodge represent influences of horticultural groups on the Northeastern Plains to the south and east. Interrelationships with the Boreal Forest are evident in the continuation of the Blackduck Horizon; the nature of the relationship, i.e., migration or seasonal movement, can not be ascertained because neither the temporal controls nor subtleties of stylistic change are adequately understood.

Southwestern Manitoba continued as an important region for groups from both the Boreal Forest and the Northeastern Plains. It maintained several co-existing groups. The primary resource in components from the Middle Period was bison. However, the presence of sedentary village dwellers and a small earth lodge raise the problem of whether horticultural activities were important.

Late Period A.D. 1200-1675

During the Late Period, both climatic and cultural changes developed. Two different climatic regimes have been proposed for this period, and the archaeological record in Southwestern Manitoba during the two regimes is somewhat different. The Pacific I Episode (A.D. 1200-1450), which was characterized by increased westerlies, reduction in rainfall, and northern and eastern extension of the grasslands, led to change in horticultural practices on the Northeastern Plains. Many of the southern Extended Middle Missouri sites of South Dakota were abandoned (Lehmer 1971: 105), large Mississippian centres such as Cahokia were abandoned circa A.D. 1300 (Fowler and Hall 1972), the Mill Creek Complex disappeared from northern Iowa as a distinct identity *circa* A.D. 1400 (Anderson 1969: 139), and Oneota sites shifted toward a trend of settlement factionalization *circa* A.D. 1300 (Gibbon 1974). The Blackduck Horizon underwent reduction in areal distribution with a shift eastward towards the Conifer-Hardwood Biome near Lake Superior by approximately A.D. 1400.

Prior to A.D. 1400, there were two complexes that represented Woodland influences (e.g., the continuation of the Blackduck Horizon and the appearance of the Snyder Dam II component), the persistence of the Devil's Lake-Sourisford

Burial Complex (e.g., the Reston Burial and the Feland Village Site), and the possible persistence of Extended Middle Missouri settlements. Evidence for the Blackduck Horizon is circumstantial; the Bjorkland Site in the Winnipeg River Region of Southeastern Manitoba as well as the Smith Village and mounds and McKinistry Mound 2 in northern Minnesota have dates within this period (Table 6, page 279). It has been suggested earlier that on the basis of the dates, the Blackduck Horizon withdrew eastward to the Upper Great Lakes Area circa A.D. 1400.

The Snyder Dam Occupation II component dated at A.D. 1285± 70 (S-740) contained a limited ceramic sample unlike anything else that has been reported for the Northeastern Plains (Syms 1974a). One reconstructed vessel is globular with a sharply carinated shoulder, vertical sides, surface finish consisting of an open twinned textile impression, and cord-wrapped dowel decorated lip; in general appearance it exhibits "Woodland" rather than "Plains" traits.

The only dated samples associated with the Devil's Lake-Sourisford Burial Complex are also associated with this period. The Reston Burial, with its mortuary vessel incised with a thunderbird and broken arrow, is definitely part of the Devil's Lake-Sourisford Burial Complex and is dated A.D. 1285± 175 (S-743) (Braddell et al 1970; Syms and Heathcote n.d.).

The Feland Site is tentatively assigned to the same burial complex because it has a number of ceramic traits that have been reported mainly on the mortuary vessels, e.g., incised rim decoration consisting of narrow, curved parallel designs, parallel incised lips, and tabs with incised lines perpendicular to the lip (Syms 1974e). The Feland pottery reflects an outgrowth of Mississippian and/or Middle Missouri influences. Vessels are often smooth, plain to polished, dark, dense, and lack the check stamping of more southerly ceramics. It is dated A.D. 1450± 130 (S-686) Syms 1974e).

There is no direct archaeological evidence for the persistence of Extended Middle Missouri occupations. However, the combination of ethnohistoric evidence, samples of archaeological materials in nearby regions, and the likelihood of following bison through Southwestern Manitoba on a seasonal basis provide a strong argument for predicting the presence of sites. Samples of pottery found in the research region have traits such as smooth, paddle stamped surface finish which came from Extended Middle Missouri potters. It is also likely that if groups occupied the Missouri River along its northern portion and had previously occupied Southwestern Manitoba, they would have continued to use the region for autumn bison hunts. Further research is required to determine how Extended Middle Missouri hunters utilized the region.

During the latter part of the Late Period, A.D. 1400-1675, the climate returned to conditions similar to the present. During the Pacific II Episode (A.D. 1450-1550), the Boreal Forest and Conifer-Hardwood Forest attained their modern distribution.. The succeeding Neo-Boreal Episode (A.D. 1550-1850) was characterized by cool summers and cold autumns; alpine glacial developments were sufficiently extensive to warrant calling this the "Little Ice Age".

In Southwestern Manitoba, Occupation 3 at the Brockinton Site (Syms 1971a, 1972, n.d.b), Mound G (Capes 1963: 15-16; Wilmeth 1970: personal communication), and Snyder I (Syms 1971, 1974b) fall within this time period. None of these components can be assigned to any complex from any other region; the village sites contain ceramics which have unique clusters of traits.

Brockinton Site, Occupation 3, was a village dating approximately A.D. 1600 (Syms 1972, n.d.b). A preliminary assessment showed that all the faunal remains were bison and canid with the exception of one bird-bone tool.

The pottery from Brockinton, Occupation 3 includes fingernail decorated shoulders, rims with zones of reed punctate decoration bounded by cord-impressed borders, and a variety of S, straight, and curved rims with straight and curved cord-impressed designs, tool indented patterns, and plain surfaces. Surface finish is primarily a variety of textile impressions. These vessels represent a unique cluster of traits. The S-rims and cord-impressed designs represent traits that are found within the Northeastern Plains, particularly the Middle Missouri Sub-area. The zones of reed punctates and the band of oblique cord-impressed decoration have no analogs.

The Snyder I Site (Syms 1971a: 7-11, Plates 1-2, 1974b) is a single component prehistoric site with late side-notched and unnotched, triangular projectiles, bifaces, utilized flakes, a predominance of bison remains, and Knife River flint as well as parts of twelve vessels with a "hybridization" of Selkirk Horison surface finish and Plains decorative techniques (Syms 1971a, 1974b). Surface finish techniques include "basketry" impressions, intertwined linear rows of knots, tightly woven fabric, fine net mesh, and obliterated forms of fabric impressions. Decorative techniques include exterior lip crimping, interior lip indenting, fine lip notching, and two vessels with oblique cord-wrapped rod impressions on the lip. The ceramics bear some resemblances to the Stutsman, Mortlach or Long Creek materials but can not be assigned to any of these complexes. They must be treated as an isolated component with an estimated date of circa A.D. 1300-1600.

The Snyder I Site provides several insights into the dynamics of human utilization of Southwestern Manitoba. The ceramics reflect a blend of Northeastern Woodland surface finish and decorative traits unlike those reported elsewhere. There is a unique cluster of traits which suggests the interaction of groups of potters from the Boreal Forest and Northeastern Woodlands. At the Snyder I Site, the local group adapted to a Plains subsistence orientation. They also had sufficient direct or indirect contact with the quarry area of the Knife River flint, that almost all of the lithic tools and approximately 40% of the debitage is made from this material. On the basis of the lithic materials and bison, this group appears to have been familiar with and well-adapted to Plains life on at least a seasonal basis.

Mound G is assigned to this period because of its radiocarbon date of A.D. 1560± 90 (Gak-1881). The fragment of Unio shell is evidence of trade but there are no diagnostic tools to determine any cultural affiliation. The date confirms the long period of mound construction within Southwestern Manitoba.

Southwestern Manitoba shares with Saskatchewan and North Dakota the presence of isolated complexes defined by a heterogeneous mixture of traits. While it is tempting to suggest greater interaction across biomes, increased trading among groups, fission and cultural drift, or some other process, these complexes are too poorly understood to even attempt to demonstrate possible evidence for these processes. These protohistoric complexes must be reanalyzed, using refined trait selection and measures of quantitative variability.

There is little evidence to suggest that climatic alterations influenced groups. The Terminal Middle Missouri Variant sites in North Dakota were large, compact, fairly permanent, and occasionally fortified (Lehmer 1971: 127). The historically documented hunting-horticultural pattern persisted throughout both the Extended and Terminal Missouri Variants (Calabrese 1972: 67). The faunal remains reveal a heavy reliance upon hunting; bison represents 90% or more of the resources, followed by deer, antelope, elk, canids and a variety of smaller game. While faunal remains are more abundant than floral remains, domesticated corn, beans and squash were probably equally important in the subsistence regime (Calabrese 1972: 67). Wild grapes, plums, and chokecherries were also collected. The economic stability within the Middle Missouri Valley was due in part to the dependence upon two very different resources, bison and horticultural produce, which allowed for adjustments to any short-term resource fluctuations. Nomadic groups living outside the valley had to adjust to any seasonal fluctuations by increased reliance upon trade with the village groups or a shift in subsistence strategy.

The heavy reliance on bison by the village groups would have necessitated major bison hunts. During the historic period, these occurred twice a year. Similar cycles can be interpreted for the Extended and Terminal Middle Missouri groups. Regardless of the climatic shift, the bison herds would have followed a seasonal round of summer grazing on the grasslands and wintering in sheltered valleys and the Aspen Parkland. Southwestern Manitoba was within the territory of one of the major herds.

The fact that Missouri villages became large, compact, and fortified suggests a conflict situation; more concentrated settlements would impair efficient utilization of the Missouri River Valley. Increased centralization resulted in the depletion of local game and firewood, two variables that were important in determining the number of years village sites could be occupied. Therefore, since it is ultimately maladaptive, increased centralization is seen here as a response to external pressures.

The Early Historic Period A.D. 1675-1800

The Early Historic Period is characterized by the introduction of European trade items and the transitional shift of numerous Native groups in response to changing beaver resources and inter-tribal conflicts. By 1800, most Native ceramics had been replaced by historic items such as copper kettles and the identity of complexes on the basis of ceramics is no longer possible. The only excavated data in Southwestern Manitoba for this period is the Snyder Pit (Syms 1974e) which contains bison, prairie chicken, dog, and badger, two fragments of iron, and a basal radiocarbon date of A.D. 1610± 130 (GSC-1546). It was found in a field near Burial Mounds C and D and earthworks (Capes 1963: 12-14), and near another field with burial mounds and pits. The surface materials and features have not been correlated with the pit.

A number of historic complexes have been recorded from nearby areas and evidence of some of these has been found in Southwestern Manitoba. To the south, the post-contact Coalescent Variant emerged in the Missouri River Valley. The Arikara moved up river with their Coalescent Variant which was mixed with the Terminal Middle Missouri Variant of the Hidatsa and Mandan to produce a new, relatively homogeneous blend of traits that shows more consistency than is evident in the tribal differences (Lehmer 1971: 136). Vessels tend to have plain, stamped or brushed surface finish, flared, straight or S-rims with bracing or filleting, and extensive cord-impressing. Iron, copper and brass tools appear in increasing frequencies.

The Biesterfeldt Site, dated about A.D. 1740, shares a number of traits with the Missouri River Valley sites. These similarities pose intriguing problems about the degree of contact which took place prior to the historic period. The Biesterfeldt Site was tentatively assigned to the Cheyenne (Wood 1971). If groups who shifted from the Conifer-Hardwood Forest and Oak Savanna biomes to the Plains, such as the Cheyenne, utilized Southwestern Manitoba for autumn bison hunts, then evidence of a similar component should be found.

The Stutsman Complex sites and Cluny-Mortlach complex sites, with their dentate stamped and check-stamped pottery reflect common ancestry or contact with the same groups, probably the Hidatsa or Crow. If and when check-stamping and dentate stamping can definitely be assigned to the Hidatsa-Crow, then more definitive links will be made between these complexes. The Shippee Canyon and Mortlach sites represent similar manifestations and appear to have been hunting camps since no lodges were located. Similarly, none of the sites (such as Cherry Point in Southwestern Manitoba) at which this complex is identified, contains earth lodges except the Cluny Site. Southwestern Manitoba was used by the manufacturers of the Cluny-Mortlach Complex as a secondary region for seasonal hunting of bison.

On the basis of available data, the Late Period prehistoric sites and the Early Historic Period sites in Southwestern Manitoba and nearby regions cannot be assigned to any specific ethnic groups. Some ethnic groups can be eliminated because they did not occupy the region or because a prehistoric-historic continuum can be demonstrated. The Selkirk-Cree association is valid on the basis of dates, distribution, and historic items in sites. A Blackduck-Algonquian association is supported by the early appearance around the Upper Great Lakes, its spread into the Northern Plains, its persistence into the historic period in Ontario where it has been identified with the Saulteaux or Chippewa, and a widespread distribution of similar materials confined to the Upper Great Lakes and Boreal Forest which corresponds with northern and central Algonquian distributions. The Biesterfeldt Site in eastern North Dakota has been tentatively associated with the Cheyenne. There are still many groups to be considered. The Arapaho, Gros Ventre, Blackfoot confederacy, Hidatsa-Crow, Mandan, the Teton, Santee and Yankton-Yanktonai-Assiniboin groups, groups such as the Ponca and Omaha who probably occupied Minnesota, and groups who disappeared prior to the historic period because of disaster or amalgamation with other groups must all be considered candidates for the various archaeological complexes. It is premature to assign most of the known protohistoric and historic complexes to ethnohistorical groups until more is known about the numbers of complexes that exist and how these complexes relate to one another in terms of tool inventories, territoriality, and temporal relationships.

Summary

Despite the fragmentary nature of the archaeological record, it is evident that the Late Woodland cultural history of Southwestern Manitoba is both complicated and dynamic. New complexes appeared and disappeared. New relationships developed between Southwestern Manitoba and the sedentary tribes to the south. The fur trade created the final set of disruptions that eventually led to European settlement, reservations, and the loss of much of the culture that is the main concern here.

Postulate 18

> Fifteen different components, complexes, horizons, and other archaeological expressions representing possibly fourteen different groups, are known from Manitoba during the Late Woodland Stage.

Almost every component that has been excavated represents a new complex. Brockinton 1 and 3, Snyder Dam I and II, Stendall, Snyder I, and Feland habitations are newly identified components. Brockinton 2 and the plough zone of the Cherry Point Site are examples of the Blackduck Horizon and are the only components that fit the earlier Melita Focus which was considered a regional variant of the Blackduck Focus. Direct evidence exists for the Devil's Lake-Sourisford Burial Complex. The indirect evidence for the Arvilla Burial Complex and Extended Middle Missouri Complexes is based upon proximity of known distributions and oral accounts. Isolated features such as the Heath Lodge, Riverview and G mounds, and Snyder Pit represent single activity loci that provide evidence only on time of occupation.

Eleven of the fifteen archaeological manifestations were discovered since the current research project was initiated. Four others, the Reston Burials, Heath Lodge, and the dated mounds have been re-assessed because of new data.

The Arvilla Burial Complex and the Extended Middle Missouri Complex are inferred from indirect evidence and could not have been considered without the comparative analysis; the more common approach of beginning within the region and conducting limited comparisons of diagnostic traits would not have yielded the insights into the probable occurrence of these complexes.

Postulate 19

> Both Woodland and Plains groups utilized Southwestern Manitoba during the Late Woodland Stage.

The Blackduck Horizon represents a Boreal Forest and Upper Great Lakes intrusion. Snyder Dam II is also Woodland. The Snyder I Site contains a hybridization of Selkirk traits from the Boreal Forest and Northeastern Plains lip decoration. Other components such as Brockinton 3 and the Devil's Lake-Sourisford are clearly Plains examples.

Hypothesis 13

> The Grassland and river valley habitats in Southwestern Manitoba were used primarily as spring and autumn bison hunts.

In order for this hypothesis to be true, all sites must have:

1. faunal remains that could be obtained in the autumn;
2. no faunal remains that could not be obtained during the autumn;
3. a predominance of bison;
4. a location in a habitat where bison would be found during autumn.

Despite the presence of a variety of definable complexes over a two thousand year period, there was a remarkable homogeneity in resource emphasis. All habitation sites in Southwestern Manitoba have a predominance of bison as does the only Archaic site, Cherry Point. This subsistence emphasis is in marked contrast to sites in the Aspen Parkland where bison was supplemented by a variety of small and medium-sized game. On the basis of the current sample, Southwestern Manitoba appears to have been used primarily on a seasonal basis with a focal, resource-specific exploitive orientation based on bison. The available data show that:

- a) all sites for which there have been faunal analysis are represented by a predominance of bison; this pattern occurs from Archaic Oxbow-McKean to Lake Woodland occupations;
- b) bison were present only during autumn, winter, and spring;
- c) bison were most numerous in the research region during spring and autumn. During the winter most moved farther east into the Aspen Parkland;
- d) a number of seasonally specific species were found in the sites that could be obtained only during the autumn (e.g., fresh water clams at the Stott and Stendall sites) or spring and autumn (e.g., migratory water fowl);
- e) burial mounds which are associated with many sites had to be reconstructed during frost-free seasons;
- f) during the early historic period, the region was used primarily during the autumn for bison hunts. Winter activities were confined to sheltered habitats such as Turtle Mountain.

Hypothesis 14

During the Late Woodland Stage, Southwestern Manitoba was occupied by several groups of Plains and Boreal Forest nomadic tribal groups who developed symbiotic relationships with horticultural groups to the south.

This hypothesis is based upon the following evidence:

- a) Fifteen different complexes, horizons and components were known for the Late Woodland (Postulate 18);
- b) Both Woodland and Plains groups are present (Postulate 19);
- c) Most sites were occupied by nomadic hunters
    - i) no permanent earth lodges have been found
    - ii) storage pits and earth embankments do not appear until the protohistoric and historic period, and even then are not of sufficient magnitude to require corvee labour
    - iii) scapula hoes and other tools associated with horticulture are not common
    - iv) bison was the predominant animal protein resource in all sites; bison hunting requires mobility;
- d) Population growth developed as a result of migrations of groups into the Aspen Parkland and Northeastern Plains (Postulates 15, 17);
- e) Historic groups developed symbiotic relationships between nomads and horticulturalists;
- f) The presence of non-local trade items provide evidence for trade networks similar to the historic period.

The Co-Influence Sphere Model and Future Research Needs

Interpretations are influenced by the methodological framework within which problems and data are perceived. The Co-Influence Sphere Model provides a framework within which one can determine what questions to ask, what data are required, what data are currently available, what information is probably present but has not been reported because of lack of research, and what research needs to be conducted in the future.

The model requires preliminary research to ascertain the resource potential of the biophysical environment and its traditional utilization by the various groups which constitute the social environment. For Southwestern Manitoba, this research clearly demonstrates that utilization of the region involved seasonal activities by a number of co-existing groups with different exploitive cycles who were involved in both negative and positive exchanges. The research further demonstrates that group mobility and resource exchange across biomes was much greater than has been previously recognized. Both ethnohistoric and archaeological data show that a sequential, chronological orientation obscures the cultural variability and curtails insights into changing settlement distributions and subsistence activities.

Prior to the current research program, the Assiniboin were considered the sole occupants of Southwestern Manitoba. The development of the Co-Influence Sphere Model with its concomitant requirement to utilize accounts from beyond the region resulted in the identification of at least nine and possibly as many as fifteen ethnohistoric groups who used the region during the early and mid 1700's and eight and possibly ten for the late 1700's and early 1800's. There is, however, much more research required to determine how many groups actually utilized

Southwestern Manitoba.

The essence of the Co-Influence Sphere Model is to explain the essential contemporaneity of variability in any region due to overlapping territories of co-existing groups, on at least a seasonal basis. Therefore, this model has important implications for the currently important discussions in anthropology on the nature of territoriality, population structure, demographic controls, and population pressure (Polgar 1972, 1974; Sussman 1972; Hassan 1973; Sengel 1973).

The original data from travellers' accounts, fur traders' journals, and correspondence need to be re-assessed. The Hudson's Bay Company archives were recently moved to Winnipeg and provide a wealth of data. Ray's (1974) recent work on the seasonal rounds of the Cree and Assiniboin provides a new perspective for understanding traditional subsistence-settlement patterns. However, much more work is required for all of the groups who occupied Southwestern Manitoba. The original data need to be re-assessed with an emphasis upon dates of observation, exact movements of groups, demography of groups, and quantification of resources utilized, i.e., number of animals killed at any time and the interval between kills. Future research must include both American and Canadian sources in French and English and must involve a return to original resources.

The current research has already demonstrated that numerous groups co-existed during the Middle and Late Woodland stages. More research is required to determine the total number of complexes that occupied Southwestern Manitoba, how and why the populations of each complex appeared, utilized the region and disappeared, and how the populations interacted with populations in other regions and areas. It is evident from ethnohistoric records that groups appeared suddenly and later disappeared as a result of migration and inter-tribal conflict. The evidence for certain archaeological examples such as the Blackduck Horizon supports the interpretation of a sudden migration. However, there is inadequate data to state what happened to any of the complexes. It is mandatory to provide proof of transitional developments before stating that one complex evolves into a later complex since emmigration of the earlier complex and immigration of the later complex are valid alternatives.

An overview of the archaeological data demonstrates that the archaeological record is incomplete. Furthermore, collection of adequate data on the cultural history will require decades of research. It is impossible to approach this region, and probably any region, with a short-term research design and obtain meaningful data. In order to seek answers to the processes of changing adaptive strategies, archaeologists must shift from a short-term, "frontier" orientation, to a long-term, intensive regional commitment, e.g., the recent efforts in the Lower Illinois Valley reflect such a long-term, intensive research design.

While it is desirable to have a complete record of all sites in all regions, this goal is not feasible. Therefore future research must be directed toward obtaining optimum insights with selected data. The data on shifting resource potential and some of the ethnohistoric accounts prove that the wooded uplands such as Turtle Mountain and Tiger Hills were important during the winter season. Future research will involve testing the uplands to determine which complexes utilized this habitat and to determine how the uplands archaeological samples are different from the spring and autumn habitations in the grassland portion of the region.

Research is currently being conducted at Oak Lake, one of the two large lakes, and future research will also take place at Whitewater Lake. Future emphasis will be placed on obtaining a cross-section of the archaeological samples throughout the region.

Reconstruction of palaeoenvironments requires cooperation among a number of disciplines such as palynology, botany, zoology, pedology, and geology. The importance of these disciplines is not new, but the rigour of the Co-Influence Sphere Model requires two immediate changes. Palynologists must be encouraged to refine their sampling techniques and tighten temporal controls so that short-term vegetation changes can be identified. The 2,000 year palynological stages developed in southern Manitoba are of little use (Ritchie 1969; Ritchie and Lichti-Federovich 1968). Not only must the number of samples be increased, but much better temporal control must be exercised. One step might be to take three cores for every core that is analyzed so that sufficient organic materials can be extracted from the remaining cores for dating.

Another area of research that has been neglected by archaeologists working on the Plains (and much of North America) is a detailed understanding of wildlife behaviour. If Native groups during the pre-European and early fur trade periods relied upon the movement and distribution of flora and fauna, then it is mandatory that knowledge of the resource potential be refined to the degree that changing habits, habitat preferences, and resource potentials of all resources can be determined. Wildlife resource management studies must become basic data resources. Smith's (1973) study of the resource potential of the Middle Mississippi is one of the few comprehensive efforts to accomplish this task.

It is not adequate merely to list the local animals available or to list the number of bones of each particular species in a site. It is equally important to know what animals were available, how their behaviour during any season made them vulnerable resources, what expenditure was required for given returns, and what kinds of resource management were being practised. This study has demonstrated the importance of a seasonal shift in the overall resource potential for understanding the impact of animal migration on human population movements. Future studies might consider the paucity of some resources such as bird remains in sites on the Northeastern Plains and to determine whether this absence is due to cultural bias, archaeological sampling, wildlife behaviour, or lack of adequate returns for effort expended.

An awareness that human populations travelled and traded over large areas and across several biomes requires a change in the attitudes of many archaeologists. Networks of communication must be increased through the exchange of data, standardization of trait selection, typology, and terminology. For example, there are as many typologies for late side-notched projectiles on the Northern Plains as there are researchers who have tried to classify them (MacNeish 1958; Wettlaufer and Mayer-Oakes 1960; Forbis 1960; Kehoe 1966b, 1967, 1973), and as long as this proliferation of typologies persists there will be no effective comparison of data.

Ceramics require as much standardization. Archaeologists have been unable to quantify, describe, or compare such traits as tempering and surface finish; the end result is almost invariably general terminology such as "course, medium or fine", an absence of illustrations to demonstrate the categories, and lack of systematic quantification. Important differences among ceramic samples include surface texture and the nature of the fabric impressions. The only effective manner of communication relating to these variables is to exchange and handle comparative samples. Ceramics from two regions may share a general set of decorative traits such as cord-impressed decoration and S-rim profiles but show a decline in craftsmanship as reflected in paste, tempering, and surface finish; it has been this tendency to compare traits from published photos that resulted in the misidentification of ceramics from Southwestern Manitoba as Mandan sherds (Capes 1963).

Standardization of lithic raw material classes is essential to an understanding of movement and exchange networks. Certain raw materials such as obsidian or Knife River flint may be widely recognized but areal variations in cherts and the distribution of outcrops are not well known. A minor frequency of a particular chert such as Selkirk chert from the Red River Region may be lumped under a broad chert category when in fact it is localized in distribution. The presence of this localized chert provides new insights into trade among groups and/or movement across the landscape. Errors in identification of sources of raw materials (e.g., misidentifying the Souris Sands and Gravels Formation as a source of Knife River flint) result in erroneous interpretations about the movements of peoples who utilized the raw materials. Furthermore, identification of sources of raw materials will be important for resolving specific problems such as whether some of the Blackduck sites in Southwestern Manitoba represent camps of populations who moved out onto the Plains from the Boreal Forest of Ontario seasonally to hunt bison, bringing some of their cherts, quartzites and argillaceous materials with them, or whether they represent populations who moved seasonally within a much smaller territory and utilized local materials.

In order to standardize lithic material identifications, it will be necessary to exchange samples of local and non-local materials among researchers in nearby areas, to systematically describe the materials using standardized geological terms, and to display materials according to material at conferences and institutions. Conferences devoted to exchanging terminology and samples must take place or archaeologists may never identify movements of specific groups over long distances on the basis of raw materials.

Analysis of artifacts must be refined in order to detect minor changes in temporal and geographical distributions. Much of the present data have been lumped under horizons or composites because there has been little effort to study and clarify the importance of regional variation. Two notable exceptions are Stoltman's (1973) modal analysis of Laurel rim sherds, and Dawson's modal analysis of Blackduck sherds from sites in Manitoba, Minnesota, and Western Ontario. Present efforts to reduce the proliferation of numerous noncomparable typologies include classifying the Blackduck Horizon materials within the modal typology developed by Dawson (1974a), visiting researchers and institutions in other areas who have materials that have artifact categories similar to those from Southwestern Manitoba, and maintaining continuous communication with researchers in nearby areas. Future research will entail increased exchange of artifacts and ideas at the descriptive and analytical levels.

Given a situation in which numerous groups were interacting, some "blending" of traits will occur due to exchange of items, exchange of people, or diffusion of ideas. The definition of complexes must be treated as a series of overlapping clusters of artifacts with a presence-absence dichotomy of certain traits and different frequencies of other traits. As physical anthropologists have shifted from population types to clines, so must archaeologists shift to complex or composite clines.

Some of the proto-historic materials from Southwestern Manitoba contained "blends" of traits from different areas, e.g., the Snyder I component with Selkirk surface finish and Plains lip decoration. The Laurel and Blackduck horizons represent temporal and geographical variation that overlap internally and with other bordering archaeological complexes (Stoltman 1973; Dawson 1974a). These horizons occur in a biome where historic groups existed as small, autonomous interacting bands.

The shift from horizons to overlapping complexes requires a change from defining and illustrating normative types to quantification of frequency variation in traits. In order to make data from any component of comparative value for understanding data from other components within and beyond the region, the range of variation of traits must be quantified and illustrated. Future research will involve increased refinement of modal analysis and increased emphasis on many illustrations.

The realization that numerous groups co-existed, that groups interacted to varying degrees, and that the known record is incomplete makes it mandatory that each new component or complex be described and illustrated in detail. Furthermore, each of these components must be subsumed with other components into complexes, composites, configurations or patterns only after rigorous comparisons have been made and a detailed discussion of the basis for combining the components has taken place. Any effort to combine components prematurely may result in obscuring the variability that exists.

Many of the sites that have been excavated on the Northern Plains and Southern Boreal Forest are multiple component sites (MacNeish 1958; Mayer-Oakes 1970; Wright 1971; Forbis 1962; Byrne 1973; Kehoe 1967, 1973, 1974). In most if not all multiple component sites, the culture history has been obliterated or modified by post-depositional factors. For many sites, the absence of depositional stratigraphy has necessitated excavation by arbitrary levels which inevitably leads to the mixing of materials from various occupations and consequently obliterates distinctions between components. The changing frequencies of artifacts, often expressed as a series of typological unimodal curves, are treated as a gradual change in cultural developments rather than as a construct of the archaeologist with his collapsed stratigraphy. In most if not all sites, including those with clear stratigraphy, the cultural record is modified by rodent activities. Since frequencies of attribute variation may be more important than a presence-absence typological distinction, any alteration due to post-depositional factors influences subsequent analysis. Future research should emphasize excavations of single component sites in order to obtain definitive samples lacking mixture due to post-depositional processes. The present excavations at the Stott Site, a "pure" Blackduck site, provides a pure assemlage. Future research must include the excavation of small, single component sites in which there has been no mixing of tool kits across assemblages due to post-depositional processes.

Dating is extremely important. Since the emphasis is upon contemporaneity or lack of it for two or more complexes at any particular time and upon changes in territoriality through time, each component should have multiple radiocarbon dates.

Two or more dates from a component can be combined to produce a date that has a reduced temporal range at one or two standard deviations as was done with the Snyder Dam I sample. The more precise the dates for each component and the greater the number of dated components for each assemblage, the greater the rigour of interpretations.

The Co-Influence Sphere Model provides data on information gaps that can or do occur. These data enable the researcher to alter a research strategy in order to solve specific problems. Within Southwestern Manitoba, future research must involve Turtle Mountain to determine if it was an important part of a season cycle. In regions outside Southwestern Manitoba, it is important to initiate research in the Pembina Valley Region in order to compare subsistence activities and to determine if Extended Middle Missouri villages did occur.

Finally, the model enables a researcher to escape the circular reasoning of using only the local artifacts to interpret the artifacts. The absence of anticipated traits, logical reasoning based upon developments elsewhere, plus a consideration of both environmental and cultural variables frees the researcher from a total reliance upon limited local data. It would have been impossible to recognize the widespread displacement of populations that coincide with the Neo-Atlantic Climatic Episode, to infer the presence of the Arvilla Burial Complex and Extended Middle Missouri occupations, to identify the geographical distributions of various complexes, and to identify the utilization of Southwestern Manitoba as a core, secondary, or tertiary area on the basis of local data. It would also have been impossible to consider the potential impact of population growth, movement, and changing social organization on the Northeastern Plains as a whole and Southwestern Manitoba in particular without an understanding of shifting resource potential, ethnohistorical mobility, and changing archaeological distributions. Future research will provide evidence of even greater complexity, but the variability of the archaeological record and processes that can be interpreted from the record will be accomplished only if one begins with the realization that the complexity demonstrated by the Co-Influence Sphere Model exists and if communication and exchange of raw data between researchers increases.

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APPENDIX A

TABULAR DATA ON BIOPHYSICAL RESOURCES

TABLE A - 1

COMMON AND SCIENTIFIC NAMES OF FLORA

Common Name	Scientific Name
Alder	Alnus sp.
Apple	Pyrus sp.
Apple, crab	Pyrus rivularis
Arrow-leaf	Sagittaria sp.
Ash, black	Fraxinus nigra
Ash, lance-leafed or green	Fraxinus pennsylvanica
Ash, red	Fraxinus pennsylvanica
Ash, white	Fraxinus americana
Aspen	Populus
Balsam	Abies balsamea
Basswood	Tilia americana
Beech	Fagus grandifolia
Beech, blue	Fagus grandifolia
Bergamot, wild	Monarda fistulosa
Bilberry, sour-top	Vaccinium sp.
Birch, white or paper	Betula papyrifera
Birch, yellow	Betula alleghaniensis
Bladderwort	Utricularia sp.
Blueberry	Vaccinium uleqinosium
Box elder	Acer negundo
Bulrush	Scirpus validus
Bunchberry	Cornus canadensis
Buttercup	Ranunculus sp.
Butternut	Juglans cinerea
Cactus, prickly pear	Opuntia polyacantha
Cactus, purple pin-cushioned	Neomamillaria vivipara
Cattails	Typha latifolia
Cedar, eastern or white	Thuja occidentalis
Cherry, black	Prunus serotina
Cherry, choke	Prunus virginiana
Cherry, pin	Prunus pensylvanica
Cinquefoil, shrubby	Potentilla fruticosa
Clover	Trifolium sp.
Coralberry	Symphoricarpos orbiculatus
Corn, domesticated	Zea maize
Cottongrass	Eriophorum angustifolium
Cottonwood	Populus sargenti
Cottonwood, common	Populus deltoides
Cranberry, high bush	Viburnum trilobum
Currant, black	Ribes americana

Common Name	Scientific Name
Dogwood	Cornus Canadensis
Dogwood, red-osier	Cornus stolonifera
Elm, American	Ulmus americana
Elm, rock	Ulmus thomasii
Elm, slippery	Ulmus rubra
Fir, balsam	Abies balsamea
Fireweed	Epilobium angustifolium
Gooseberry	Ribes oxyacanthoides
Grapes	Vitis sp.
Grass, big bluestem	Andropogon scoparius
Grass, grama	Bouteloua sp.
Grass, Indian	Sorghastrum nutans
Grass, porcupine	Stipa spartea
Grass, reed	Phragmites communis
Grass, spear	Stipa comata
Hackberry	Celtis occidentalis
Hawthorn	Crataegus
Hazel, American	Corylus americana
Hemlock, eastern	Tsuga canadensis
Hickory, butternut	Carya cordiformis
Hickory, shagbark	Carya ovata
Honeysuckle	Lonicera sp.
Hop-hornbeam	Ostrya virginiana
Horsetail	Equisetum sp.
Indian bread-root or turnip	Psoralea esculenta
Juneberry	Amelanchier sp.
Labrador tea	Ledum groenlandicum
Larch or Tamarack	Larix laricina
Larkspur	Delphinium sp.
Laurel	Kalmia latifolia
Leather-leaf	Chamadaphne calyculata
Locoweed	Oxytropics sp.
Lupine	Lupinus sp.
Maple, dwarf or mountain	Acer spicatum
Maple, Manitoba or box elder	Acer negundo
Maple, red	Acer rubrum
Maple, silver	Acer saccharinum

Common Name	Scientific Name
Maple, sugar	Acer saccharum
Mountain-ash, American	Pyrus americana
Mountain-ash, northern	Pyrus decora
Nannyberry	Viburnum lentago
Northern comandra	Comandra richardsiana
Oak, black	Quercus velutina
Oak, bur	Quercus macrocarpa
Oak, dwarf chinkapin	Quercus prinoides
Oak, jack	Quercus ellipsoidalis
Oak, red	Quercus rubra
Oak, white	Quercus alba
Onion, early white	Allium textile
Onion, wild	Allium canadense
Pine, eastern white	Pinus strobus
Pine, jack	Pinus banksiana
Pipewort	Eriocaulon compressum
Plum, buffalo	Geoprumnon crassicarpum
Plum, wild	Prunus americana
Poplar, aspen	Populus tremuloides
Poplar, aspen large tooth	Populus grandidentata
Poplar, balm-of-gilead	Populus candicans
Poplar, balsam	Populus balsamifera
Poplar, common cottonwood	Populus deltoides
Poplar, cottonwood	Populus sargenti
Rabbit brush	Chrysothamnus sp.
Raspberry	Rubus idaeus
Rice, wild	Zizania sp.
Rose, prairie	Rosa acicularis
Rosemary	Andromeda sp.
Rowanwood	Sorbus sp.
Sagebrush	Artemisia sp.
Saltbrush	Atriplex sp.
Sand Reed	Calamovilfa longifolia
Saskatoon	Amelanchier alnifolia
Sedge	Carex
Silverberry or Wolf Willow	Elaeagnus argentea
Snowberry	Symphoricarpos albus
Snowberry, western	Symphoricarpos occidentalis
Spike rush	Eleocharis palustris
Spruce, black	Picea mariana

Common Name	Scientific Name
Spruce, white	Picea glauca
Spurge	Euphorbia corollata
Sugarberry	Celtis laevigata
Sumac	Rhus
Sumac, smooth	Rhus glabra
Sundew	Drosera sp.
Sycamore	Platanus occidentalis
Tamarack or larch	Larix laricina
Walnut, black	Juglans nigra
Watermilfoils	Myriophullum sp.
White top	Scolochloa Festucacea
Willow	Salix
Willow, sandbar	Salix interior
Willow, wolf or American Silverberry	Elaeagnus commutata
Winterfat	Eurotia lanata
Wolfberry or Wolf Willow (See Snowberry, western)	Symphoricarpos occidentalis

TABLE A - 2

COMMON AND SCIENTIFIC NAMES OF FAUNA

A. MAMMALS

Common Name	Scientific Name
Antelope, pronghorn	Antilocapra americana
Badger	Taxidea taxus
Bear, black	Urus americanus
Bear, grizzly	Urus horibilis
Beaver	Castor canadensis
Bison	Bison bison
Bobcat	Lynx rufus
Caribou	Rangifer tarandus
Caribou, barren-ground	Rangifer tarandus groenlandicus
Caribou, woodland	Rangifer tarandus caribou
Cougar or mountain lion	Felix concolor
Coyote	Canis latrans
Deer, mule	Odocoileus hemionus
Deer, mule or black-tailed	Dama hemionus (Hall & Kelson)[1]
Deer, white-tailed	Odocoileus virginianus
Deer, white-tailed northern	Odocoileus virginianus borealis
Deer, white-tailed plains	Odocoileus virginianus dacotensis
Elk (wapiti)	Cervus canadensis
	Cervus elaphus (Banfield)
Fox, grey	Urocyon cinereoargenteus
Fox, red	Vulpes fulva
Fox, swift	Vulpes velox
Lynx	Lynx canadensis
Marten	Martes americana
Mink	Mustela vison
Moose	Alces alces
Muskrat	Ondrata ziberthicus
Otter, river	Lutra canadensis
	Lontra canadenis (Banfield)

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[1] Names in parentheses refer to references used when there was a lack of agreement on terminology.

Common Name	Scientific Name
Porcupine	Erethizon dorsatum
Porcupine, Nebraska yellow-haired	Erethyzon dorsatum bruneri
Raccoon	Procyon lotor
Rabbit, eastern cottontail	Sylvilagus floridanus
Rabbit, snowshoe (hare)	Lepus americanus
Rabbit, white-tailed jack	Lepus townsendii
Sheep, bighorn	Ovis canadensis
Skunk, striped	Mephitis mephitis
Squirrel, ground 1	Spermophilus sp.
Squirrel, red	Tamiasciurus hudsonicus
Wapiti or elk	Cervus canadensis Cervus elaphus (Banfield)
Weasel, least	Mustela nivalis
Weasel, long-tailed	Mustela frenata
Weasel, short-tailed	Mustela erminea
Wolf, grey or buffalo	Canis lupus nubilis
Wolf, Saskatchewan timber	Canis lupus grisoalbus
Wolverine	Gulo luscus (Soper) (Wrigley) (Hall & Kelson) Gulo gulo (Banfield)
Wolf	Canis lupus
Woodchuck	Marmota monax

B. BIRDS

Common Name	Scientific Name
Bittern, American	Botaurus lentiginosus
Bittern, least	Ixobrychus exilis
Bluejay	Cyanocitta cristota
Bufflehead	Bucephala albeola
Canvasback	Aythya valisineria
Coot, American	Fulica americana
Cormorant, double crested	Phalacrocoraxauritus
Crane, whooping	Grus americana
Crow, common	Corvus brachyrhynochos
Duck, lesser scaup	Aythya affinis
Duck, mallard	Anas platyrhynchos

Common Name	Scientific Name
Duck, redhead	Aythya americana
Duck, ring-necked	Aythya collaris
Duck, rudy	Oxyura jamaicensis
Duck, wood	Aix spensa
Eagle, bald	Haliaeetus leucocephalus
Eagle, golden	Aquila chrysaetos
Egret, common	Casmerodius albus
Falcon, prairie	Falco mexicanus
Gadwall	Anas strepera
Goldeneye	Bucephala clangula
Goose, Canada	Branta canadensis
Goose, Ross's	Chen rossii
Goose, snow	Chen caerulescens
Goose, white fronted	Anser albifrons
Goshawk	Accipiter gentilis
Grackle, common	Quiscalus quiscula
Grebe, eared	Podiceps caspicus
Grebe, horned	Podiceps auritus
Grebe, pied-bill	Podilymbus podiceps
Grebe, red-necked	Podiceps grisegena
Grebe, western	Aechmophorus occidentalis
Grouse, ruffled	Bonasa umbellus
Grouse, sharp tailed	Pedioecetes phasianellus
Grouse, spruce	Canachites canadensis
Gull, ring-billed	Larus delawarensis
Gyrefalcon	Falco rusticolus
Hawk, Coopers	Accipiter cooperii
Hawk, ferruginous	Buteo regalis
Hawk, marsh	Circus cyaneus
Hawk, pigeon	Falco columbarius
Hawk, rough-legged	Buteo lagopus
Hawk, sharp skinned	Accipiter striatus
Hawk, sparrow	Falco americaine
Hawk, Swainson's	Buteo swainsonii
Hawk, swallow-tailed	Elanoides forficatus
Heron, black-crowned	Nycticorax nycticorax
Heron, Great blue	Ardea herodias
Jay, blue	Cyanocitta crisata
Jay, Canada or grey	Perisoreus canadensis

Common Name	Scientific Name
Killdeer	Charadrius vociferus
Kingfisher, belted	Megaceryle alcyon
Lark, Horned	Eremophila alpestris
Loon, common	Gavia immer
Magpie, black-billed	Pica pica
Merganser, common	Mergus merganser
Merganser, hooded	Lophodytes cucullatus
Merganser, red-breasted	Mergus serrator
Nighthawk, common	Chordeiles minor
Osprey	Pandion haliaetus
Owl, barn	Tyto alba
Owl, barred	Strix varia
Owl, boreal	Aegoluis funereus
Owl, burrowing	Speotylo cunicularia
Owl, great horned	Bubo virginianus
Owl, hawk	Surnia ulula
Owl, large-eared	Asio lutus
Owl, sawwhet	Aegoluis acadicus
Owl, screech	Otus asio
Owl, short-eared	Asio flammeus
Owl, snowy	Nyctea scandiaca
Partridge, Hungarian	Perdix perdix
Partridge or ruffled grouse	Bonasa umbellus
Pelican	Pelecanus erythrorhynchos
Pheasant, ring necked	Phasianus colchicus
Pigeon, passenger	Ectopistes migratorius
Pintail	Anas acuta
Plover, golden	Pluvalis dominica
Plover, black-bellied	Squatarola squatarola
Prairie chicken	Tympanuchus cupido
Rail, Virginia	Rallus limicola
Rail, yellow	Coturnicops noveboracensis
Raven, common	Corvus corax
Redhead	Aythya americana
Scaup, greater	Aythya marila
Scaup, lesser	Aythya affinis
Shoveller	Spatula clypeata
Snipe, common	Capella gallinago

Common Name	Scientific Name
Sora	Porzana carolina
Swan, whistling	Olor columbianus
Teal, blue winged	Anas discors
Teal, green winged	Anas carolinensis
Tern, Caspian	Hydroprogne caspia
Thrasher, brown	Toxostoma rufum
Widgeon, American or baldpate	Mareca americana
Vulture, turkey	Cathartes aura

C. FISH

Common Name	Scientific Name
Bass, largemouth	Micropterus salmoides
Bass, rock	Ambloplites rupestris
Bass, smallmouth	Micropterus dolomieui
Black crappie	Pomoxis nigromaculatus
Buffalo fish, big-mouth	Ictiobus cyprinellus
Bullhead, black	Ictalurus melas
Bullhead, brown	Ictalurus nebulosus
Burbot	Lota lota
Carp	Cyperinidae sp.
Catfish	Ameiuridae sp.
Catfish, channel	Ictalurus punctatus
Chub, creek	Semotilus atromaculatus
Chub, flathead	Platygobio gracilis
Chub, lake	Couesius plumbeus
Chub, silver	Hybopsis storeriana
Chubsucker, lake	Erimyzon sucetta
Cisco, blackfin or blackback tullibee	Coregonus nigripinnis
Cisco or lake herring, herring, salmon, bluebacked tullibee	Coregonus artedii
Cisco, shortjaw	Coregonus zenithicus
Dace, blacknose	Rhinichthys atratulus
Dace, finescale	Chrosomus neogaeus
Dace, longnose	Rhinichthys cataractae
Dace, red-belly	Chrosomus eos
Darter, blackside	Percina maculata
Darter, Iowa	Etheostoma exile

Common Name	Scientific Name
Darter, Johnny	Etheostoma nigrum
Darter, river	Percina shumardi
Goldeye	Hiodon alosoides
Herring, lake	Coregonius artedii
Lamprey	Ichthyomyzon sp.
Lamprey, chestnut	Ichthyomyzon castaneus
Lamprey, silver	Ichthyomyzon unicuspis
Madtom tadpole	Noturus gryrinus
Minnow, bluntnose	Pimephales notatus
Minnow, brassy	Hybognathus hankinsoni
Minnow, fathead	Pimephales promelas
Mooneye	Hiodon tergisus
Muskellunge	Esox masquinongy
Perch	Percidae sp.
Perch, log	Percina caprodes
Perch, trout	Percopsis omiscomaycus
Perch, yellow	Perca flavescens
Pickerel	Esox sp.
Pike	Esocidae sp.
Pike, northern	Esox lucius
Pumkinseed	Lepomis gibbosus
Quillback	Carpiodes cyprinus
Redhorse, shorthead or northern	Moxostoma macrolepidotum
Redhorse, silver	Moxostoma anisurum
Sauger	Stizostedion canadense
Sculpin	Cottidae sp.
Sculpin, deepwater	Myoxocephalus quadricornis
Sculpin, mottled	Cottus bairdi
Sculpin, slimy	Cottus cognatus
Sculpin, spoonhead	Cottus ricei
Shiner, blacknose	Notropis heterolepis
Shiner, common	Notropis cornutus
Shiner, emerald	Notropis atherinoides
Shiner, golden	Notemigonus crysoleucas
Shiner, mimmic	Notropis volucellus
Shiner, river	Notropis blennius
Shiner, sand	Notropis stramineus

Common Name	Scientific Name
Shiner, spottail	Notropis hudsonius
Stickleback	Gasterosteidae sp.
Stickleback, brook	Culaea inconstans
Stickleback, ninespine	Pungitius pungitius
Stonecat, small	Noturus flavus
Sturgeon, lake	Acipenser fulvescens
Sucker	Catosomidae sp.
Sucker, northern or long-nose	Catostomus catostomus
Sucker, northern hog	Hypentetium nigricans
Sucker, white or common	Catostomus commerconi
Sunfish	Centrarchidae sp.
Trout, brook or speckled	Salvelinus fontinalis
Trout, lake	Salvelinus namaycush
Walleye	Stizostedion vitrum
Whitefish, lake	Coregonus clupeaformis

D. REPTILES

Common Name	Scientific Name
Skink, prairie	Eumeces septentrionalis
Snake, common garter	Thamnophis sirtalis
Snake, plains garter	Thamnophis radix
Snake, red-bellied	Storeria occipitomaculata
Snake, smooth grain	Opheodrys vernalis
Snake, western hognose	Heterodon nasicus
Turtle, painted	Chrysemys picta
Turtle, snapping	Chelydra serpentina

E. AMPHIBIANS

Common Name	Scientific Name
Frog, chorpus	Pseudacris nigrita
Frog, gray tree	Hyla versicolor
Frog, leopard	Rana pipiens
Frog, spring peeper	Hyla crucifer
Frog, wood	Rana sylvatica
Salamander or mud puppy	Necturus maculosis
Salamander, tiger	Ambystoma tigrinim

Common Name	Scientific Name
Toad, Canadian	Bufo hemiophrys
Toad, common American	Bufo terrestris
Toad, great plains	Bufo cognatus
Toad, woodhouse	Bufo woodhousei

APPENDIX A-3

MAMMALS FOUND IN SOUTHWESTERN MANITOBA AND THEIR DERIVATIONS[a]

	Grassland	Widespread	Deciduous	Boreal Forest
A. Large Mammals				
Artiodactyla	Bison (*Bison bison*) Pronghorn antelope (*Antilocapra americana*)	Elk (Wapiti) (*Cervus canadensis*) Mule Deer (*Odocoileus hemionus*) White-tailed deer (*Odocoileus virginianus*)		Woodland Caribou (*Rangifer tarandus*) Moose (*Alces alces*)
Carnivora		Cougar (Mountain Lion) (*Felis concolor*) Grizzly Bear (*Ursus horribilis*) Black Bear (*Ursus americanus*)		
B. Medium-sized Mammals				
Carnivora		Gray Wolf (*Canis lupus nubilis*)		Timber Wolf (*Canis lupus*) Lynx (*Lynx canadensis*) Wolverine (*Gulo luscus*)
	Badger (*Taxidea taxus*)	Coyote (*Canis latrans*) Red Fox (*Vulpes fulva*) Grey Fox (*Urocyon cinereoargenteus*) Bobcat (*Lynx rufus*) Raccoon (*Procyon lotor*) River Otter (*Lutra canadensis*)		
Rodentia		Beaver (*Castor canadensis*) Porcupine (*Erethizon dorsatum*)		
C. Small Mammals				
Carnivora	Swift Fox (*Vulpes velox*)	Long-tailed Weasel (*Mustela frenata*) Mink (*Mustela vison*) Striped Skunk (*Mephitis mephitis*)		Marten (*Martes americana*) Short-tailed weasel (*Mustela erminea*) Least Weasel (*Mustela nivalis*)
Lagomorpha	White-tailed Jack Rabbit (*Lepus townsendii*)		Eastern Cottontail (*Sylvilagus floridanus*)	Snowshoe Hare (*Lepus americanus*)
Rodentia	Richardson Squirrel (*Spermophilus richardsonii*) Franklin Squirrel (*Spermophilus franklinii*) Northern Pocket Gopher (*Thomomys talpoides*) Olive-backed Pocket Mouse (*Perognathus fasciatus*) Northern Grasshopper Mouse (*Onychomys leucogaster*)	Muskrat (*Ondatra zibethicus*) Deer Mouse (*Peromyscus maniculatus*)	Woodchuck (*Marmota monax*) Gray Squirrel (*Sciurus carolinensis*) Fox Squirrel (*Sciurus niger*) Eastern Chipmunk (*Tamius striatus*)	Northern Flying Squirrel (*Glaucomys sabrinus*) Red Squirrel (*Tamiasciurus hudsonicus*) Least Chipmunk (*Eutamias minimus*) Meadow-Jumping Mouse (*Zapus hudsonius*) Western Jumping Mouse (*Zapus princeps*) Meadow Vole (*Microtus pennsylvanicus*) Red-backed Vole (*Clethrionomys gapperi*)
Insectivora	Prairie Vole (*Microtus ochrogaster*)		Short-tailed Shrew (*Blarina brevicauda*)	Masked Shrew (*Sorex cinerus*) Arctic Shrew (*Sorex arcticus*) Pygmy Shrew (*Sorex hoyi*)
Chiroptera		Little Brown Bat (*Myotis lucifugus*) Silver-haired Bat (*Lasionycteris noctivagans*) Big Brown Bat (*Eptesicus fuscus*) Hoary Bat (*Lasiurus cinereus*)	Red Bat (*Lasiurus borealis*) Keen Bat (*Myotis keenii*)	

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[a] Adapted from Wrigley (1974)

APPENDIX A-4

DATA[a] ON MAMMALS OF PRIMARY AND SECONDARY IMPORTANCE

Species	Live Weight[b]		SEASONAL ZONAL DISTRIBUTION Spring		Summer		Autumn		Winter		Comments
	Range	Ave.	Zone	I.R.[d]	Zone	I.R.	Zone	I.R.	Zone	I.R.	
I. Large Mammals											
A. Artiodactyla											
Bison	M 460-720 F 360-460	570 420	G,AP	F++	G	F+++	G,AP	F++	AP	F+	
Moose	M 385-535 F	350	BF	D	BF	D	BF	D	BF	D	
Wapiti (elk)	M 265-500 F 188-270	315 225	G,AP	F+	G,AP	F+	G,AP	F+	G,AP	F+	Treed valleys within Grassland
Caribou Woodland	M 81-153 F 63-94		BF	F++	BF	F	BF	F++	BF	F++	
Caribou, barren ground	M 81-153 F 63-94		T	F++	T	F++	T	F++	BF	F++	
Mule Deer	M 50-215 F 31-72		G,AP	D	G,AP	D	G,AP	D	AP	F+	Open areas in B.F. zone, River valleys of G. zone
White-tailed Deer	M 86-96 F 57-63		G,AP BF	D	G,AP BF	D	G,AP BF	D	G,AP BF	F+	River valleys of G. zone
Pronghorn Antelope	M 45-63 F 32-48	51 42	G	F	G	F	G	F	G	F	
B. Carnivora											
Grizzly Bear	M -526 F 136-		G,AP	D	G,AP	D	G,AP	D	G,AP	D	
Black Bear	M 115-270 F 92-140		AP,BF	D	AP,BF	D	AP,BF	D	AP,BF	D	
Cougar	M 67-103 F 30-60		W	D	W	D	W	D	W	D	
Wolf	M -45[e] F 26-		W	D	W	D	W	D	W	F+	
II. Medium-sized Mammals											
A. Carnivora											
Coyote	M F	13	W	D	W	D	W	D	W	F+	
Lynx	M -18 F 4-		AP BF	D	AP BF	D	AP BF	D	AP BF	D	
Bobcat	M -18 F 4-		AP	D	AP	D	AP	D	AP	D	
Wolverine	M 11-16 F 7-15		BF	D	BF	D	BF	D	BF	D	
Raccoon	M F	8.6 7.5	AP	D	AP	D	AP	D	AP	D	
River Otter	M -11 F 5-		AP,BF	D	AP,BF	D	AP,BF	D	AP,BF	D	
Red Fox	M -7 F 4-		W	D	W	D	W	D	W	D	
B. Rodentia											
Beaver	M -35 F 15-	20	W	D	W	D	W	D	W	D	Occupies streams along the edges of Grassland
Porcupine	M -10 F 3-		W	D	W	D	W	D	W	D	
III. Small Mammals											
A. Carnivora											
Swift fox	M 2-3 F	2 2	G	D	G	D	G	D	G	D	
Marten-Fisher Mink-Weasel	M 1-6 F 1-3		W	D	W	D	W	D	W	D	
Striped Skunk	M 2-3 F 1-2		W	D	W	D	W	D	NA		
B. Lagomorphs	M F		W	F++	W	F++	W	F++	NA		Available in regular cycles
C. Rodentia											
Muskrat	M F		W	F	W	F	W	F	W	F+	

a. Data are based on Hall and Kelson (1959); Soper (1961); Banfield (1974); Wrigley (1974).

b. All weights are in kilograms, rounded to the nearest whole number.

c. Zone symbols are: BF - Boreal Forest; AP - Aspen Parkland; G - Grassland; T - Tundra; W - Widespread

d. Intensity Rating Symbols are: D - Diffuse; NA - Data not available; F - Focal (estimates difficult); F+ - Focal (in groups such as bands or packs of 25 to several hundred); F++ - Focal (in large groups of several thousand); F+++ - Focal (in vast groups of millions).

e. Usually range for the wolf is 26-45 kg. although maximum weights of 79 kg. have been recorded for animals with large quantities of ingested sheep and greater weights for northern specimens (Banfield 1974; Peterson 1966: 196-204)

APPENDIX A-5

IDENTIFICATION, SIZE RANGE, SEASONAL PREFERENCE, AND ENVIRONMENTAL PREFERENCE OF SELECTED BIRD RESOURCES OCCUPYING OR PASSING THROUGH SOUTHWESTERN MANITOBA[a]

Species	Seasons in Southwestern Manitoba				S.W. Man.			Comments
	Sp.	S.	A.	W.	Grassland	Aspen Parkland	Boreal Forest	
A. Water Birds								
Common Loon	—	—	—			—	—	Freewater lakes; generally 2 per lake
Red necked grebe	—	—	—			—	—	Lakes, marshes, sluggish rivers
Horned grebe	—	—	—		—	—	—	Ponds, sloughs & shallow bays
Eared grebe	—	—	—		—	—		Limit is Southwestern Manitoba
Western grebe	—	—	—		—	—		Freshwater lakes
Pied-billed grebe	—	—	—		—	—		Ponds, sloughs, sluggish streams, shallow bays
White pelican	—	—	—		—	—	—	Interior lakes. In colonies
Double-breasted cormorant	—	—	—			—		Lakes & streams. In colonies
Great blue heron	—	—	—		—	—	—	Streams, rivers, sloughs, marshes
Common egret	—	—	—		—	—		In colonies
Black-crowned night heron	—	—	—			—		In colonies; lakes, ponds, streams, rivers, sloughs
Least bittern	—	—	—		—	—		Cattail marshes, ponds, & sluggish streams
American bittern	—	—	—		—	—	—	Marshes, swamps, meadows
Whistling Swan	—		—					Passes through to Arctic
Canada Goose	—	—	—		—	—	—	Some nest, some pass through
Brant Goose	—		—				—	Pass through
White-fronted Goose	—		—				—	Pass through
Snow Goose	—		—				—	Pass through; stays in marshes and lakes away from forest
Ross's Goose	—		—				—	Pass through
Mallard	—	—	—		—	—	—	Most widely known; very adaptable
Black Duck	—		—				—	Mainly eastern and northern Manitoba
Gadwall	—	—	—		—	—		Temperate climate Not numerous
Pintail	—	—	—		—	—		
Green-winged Teal	—	—	—		—	—	—	
Blue-winged Teal	—	—	—		—	—	—	
American Widgeon (Baldpate)	—	—	—		—	—	—	Sloughs, ponds, & marshy borders of lakes
Shoveller	—	—	—		—	—	—	As far east as eastern Manitoba
Wood Duck	—		—			—		
Red Head	—	—	—		—	—		Lakes
Ring-necked Duck	—	—	—			—	—	Bogs, ponds, and sloughs
Canvasback	—	—	—		—	—		
Greater Scaup	—		—					Pass through

APPENDIX A-5 (cont'd.)

Species	Sp.	S.	A.	W.	Grassland	S.W. Man.	Aspen Parkland	Boreal Forest	Comments
Lesser Scaup	—	—	—		—	—	—		
Common Goldeneye	—	—	—				—	—	Woodland lakes and muskey ponds. Nest in trees
Buffalohead	—	—	—		—	—	—		Nests in trees
White-winged Scoter	—		—					—	Rarely reaches Southwestern Manitoba
Ruddy Duck	—	—	—		—	—	—		Lakes, ponds, sloughs, Freshwater
Hooded merganser							—	—	Ponds, lakes, rivers in or near woodlands
Common merganser	—		—				—	—	May pass through
Red-breasted merganser	_?		?_					—	Unlikely to pass through
Whooping Crane	—	—	—				—		Marshy, swampy slough. Mainly aspen parkland
Sandhill Crane	—	—	—		—	—	—	—	Marshes, bogs
Virginia Rail	—	—	—				—		Fresh-water, bubrush, cattail or sedge marshes
Sora	—	—	—		—	—	—	—	
Yellow Rail									Grassy marshes
American Coot	—	—	—		—	—	—	—	Marshes, ponds, sloughs, lakes and slow river
B. Terrestrial Game Birds									
Spruce Grouse								—	Coniferous only; year round
Ruffed Grouse	—	—	—	—			—		Second stand deciduous and mixed woodland. Absent on plains
Greater Prairie Chicken	—	—	—	—	—	—	—		Mainly grassland
Sharp-tailed Grouse	—	—	—	—	—	—	—	—	Grassland, clearings, burn areas
C. Birds of Prey									
Turkey Vulture	—	—	—			—	—		Northern range in Southern Manitoba. Stays away from unbroken forest
Swallow-tailed Kite					—	—	—		
Goshawk	—	—	—				—	—	Forests and woodlands; not in Southwestern Manitoba
Sharp-shinned Hawk	=	—	=				—		Woodland and wood edges, migrates through
Cooper's Hawk	—	—	—				—		Mainly in deciduous woodland. Doesn't migrate through
Red-tailed Hawk	—	—	—			—	—		Woodland and open country
Broad-tailed Hawk	—	—	—				—		Forest and woodland; much less in coniferous forest

APPENDIX A-5 (cont'd.)

Species	Sp.	S.	A.	W.	Grassland	S.W. Man.	Aspen Parkland	Boreal Forest	Comments
Swainson's Hawk	—	—	—		—	—			plains and prairies; open the common form on prairie country
Rough-legged Hawk	—		—	—				—	Migrate through. Some winter in southern part of province
Ferruginous Hawk	—	—	—		—				Plains, prairies and "badlands"
Golden Eagle								—	Arctic and Northern Coniferous forests.
Bald Eagle								—	Coniferous forests; near large rivers & lakes; year round
Marsh Hawk	—	—	—		—	—	—	—	Fields, meadows and marches. Ubiquitous
Osprey								—	Lakes, large rivers in boreal forest. Migrant?
Gyrefalcon								—	Migrates into Northern Manitoba in winter
Prairie Falcon				—	—				Winters in Manitoba; rare
Pigeon Hawk	—	—	—		—	—	—	—	Ubiquitous; nests in trees; occasionally winters in Southern part of province.
Sparrow Hawk	—	—	—			—	—		
Barn Owl	—	—	—		—	—	—		Ocassionally wanders into Southern Manitoba
Screech Owl	—	—	—		—	—			Year round
Great Horned Owl	—	—	—	—	—	—	—	—	Ubiquitous
Snowy Owl				—			—	—	
Hawk Owl				—			—	—	Open coniferous forest and mixed woodland, bund area. Winter in southern portion.
Burrowing Owl	—	—	—		—				Short grassland, Southwestern Manitoba is edge of range.
Barred Owl							—	—	Deciduous and coniferous in Southeastern Manitoba Rare in Southwestern Manitoba
Long-eared Owl	—	—	—	—	—	—	—	—	Gregarious
Short-eared Owl	—	—	—	—	—	—	—		Shown as ubiquitous but list as Southern Manitoba
Boreal Owl				—			—	—	Lives year round in coniferous and mixed forests some winter to south.
Saw-whet Owl				—			—	—	Coniferous and deciduous forest, some winter slightly south

[a] Data are based on Godfrey (1966)

APPENDIX A-6

Distribution, Size, and Spawning Patterns of Medium and Large Fishes of Manitoba[a]

Species	Drainage Systems								Size[b]		Spawning Period	Spawning Grounds
	Grass-land	Aspen Parkland		Boreal Forest					Range	Max.		
	Souris River	Lower Assin-iboine River	Red River	Winnipeg River	Lake Winnipeg	Lake Manitoba	Northern Outlets					
Lake Sturgeon			x	x	x	x	x	W	22 -176.0	440	May-June	Large rivers, particularly Winnipeg River
								L	91.5-142.5	213.5		
Muskellunge				x				W	11.0-79.2	220		
								L	71.1-122.0	183		
Northern Pike	x	x	x	x	x	x	x	W		141	April-May	River floodplains and bays
								L		133.3		
Lake Trout			x	x	x	x	x	W		55	October	Shoreline
								L	38.1-50.8	96.8		
Cisco				x	x	x	x	W	1.5-3.5	17.6	September	Shallow shorelines
								L	20.3-30.5	41.4		
Lake Whitefish				x	x	x	x	W	6.6-8.8	17.6	September	Shallow shorelines
								L		67.6		
Blackfin Cisco						x	x	W			Similar to Cisco	
								L				
Sucker Family	x	x	x	x	x	x	x	W	6.6-13.2		May-June	Shallow streams or bays
								L	25.4-50.8			
Burbot	x	x	x	x	x	x	x	W		40.7	Jan.-March	Shallow bays
								L	(38.1)[c]	93.7		
Goldeye	x	x	x	x	x	x	x	W		6.8	May-June	Shallows of lakes and streams
								L		50.8		
Mooneye		x	x	x	x	x	x	W	(2)		April-May	Large, clear streams
								L	(37.8)			
Sunfish Family		x	x	x		x		W	-6.6			
								L	15.2-38.1	58.4		
Walleye				x	x		x	W	-2.2	41.8	April-June	Shallow shoals and tributaries
								L	33.0-50.8			
Sauger					x	x		W	-4.4		May-June	
								L	25.4-53.3			
Yellow Perch	x	x	x	x	x	x		W		2.2		
								L	20.3-30.0	38		
Catfish Family	x	x	x	x				W	1.5-8.8		May-June	Shallows of lakes and streams
								L	12.7-53.3			

a Data based on Scott and Crossman (1973) and Hinks (1943)

b Data represents ranges or maximum weights in kilograms and ranges or maximum lengths in centimeters.

c Parenthesis ( ) indicate average figure.

APPENDIX B

A SET OF ANALYTICAL MODES FOR ARIKARA POTTERY[a]

SELECTING MATERIALS

Conceptual Modes	Procedural Modes
1. A sedimentary clay should be used.	1. Clay dug from its source.
2. The clay should be tempered with crushed granite.	2. Fire-cracked granitic rock fragments collected.

PREPARING MATERIALS

Conceptual Modes	Procedural Modes
1. We cannot approximate traditional standards used to judge proper preparation of clay, or temper. Nor can we determine standards used in mixing these materials.	1. Clay cleaned of intrusive matter, sticks, stones, etc.
	2. Granitic rock fragments pounded to granular powder with stone maul.
	3. Temper mixed together with clay and water to bring plastic material to proper consistency.
	4. Clay placed in cache pit to sour?

BUILDING THE VESSEL

Conceptual Modes	Procedural Modes
1. The vessel should be molded from a lump of clay large enough to provide most of the plastic material.	1. A lump of tempered clay separated from raw clay mass.
2. A grooved paddle should be used to beat the exterior when forming the walls.	2. Clay punched and beaten into desired shape.
3. A flat-sided round to oblong stone anvil should be used to support the interior during wall building.	

SHAPING THE VESSEL (GENERAL)

If a bowl is the desired product then it should be:

1. A hemispherical vessel with rounded bottom, outflaring sides, and greatest diameter at the mouth.
2. A squat little pot with rounded bottom about as tall as wide with greatest diameter at shoulder and approximately equal neck and mouth diameters.

If a miniature pot is the desired product then it should be:

1. An extremely small hand-modeled copy of a cooking pot.

If a mortuary vessel is the desired product then it should be:

1. A miniaturization of a common cooking pot.

If a cooking pot is the desired product then it should be:

1. A vessel about as wide as tall, with approximately equal neck and mouth diameters, and a shoulder diameter about a third larger than the mouth diameter.

SHAPING THE VESSEL (SPECIFIC)

Conceptual Modes	Procedural Modes
1. Bottom should be rounded	1. Bottom beaten and pounded into smoothly rounded contour.
2. Shoulder should be rounded.	2. Body wall pulled gently upward and outward then sloped gently inward to neck.
3. Shoulder should be angular.	3. Body wall pulled gently upward and outward then bent sharply inward to neck.
4. Neck should be constricted.	4. Body walls pulled inward to maximum constriction.
5. Neck should be straight.	5. Neck drawn straight up to rim.
6. Neck should be outflaring.	6. Neck drawn upward and outward to rim.
7. Rim should be straight.	7. Rim left as top of straight neck.
8. Rim should be braced.	8. A fillet of clay added to rim exterior, or rim top pulled down upon itself to form brace.
9. Occasionally rim may be collared.	9. Rim bent outward, then drawn outward, then inward again.
10. Occasionally rim may be S-shaped.	10. Rim bent inward, then outward, then inward again.
11. Rarely rim may have an inverted L- or T-shaped appearance.	11. Rim mashed down on top.

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[a] From Krause (1972: 102-103)

ADDING APPENDAGES

If an appendage is desired it may be:

Conceptual Modes	Procedural Modes
1. A strap handle.	1. Rim brace or collar pulled outward and welded to a flat rectangular clay strap. Flat clay strap bent outward and arched downward to be: A. (1) Welded to neck or shoulder. (2) Riveted to neck or shoulder.
2. A lug.	2. Rim brace pulled outward and upward to form projecting tab.

Rules of Combination:

1. Appendages should be added only to braced and collared rims.
2. Handles alone should be added in pairs, one handle opposite the other.
3. Lugs alone should be added in pairs, one lug opposite the other.
4. If both handles and lugs are added, handles should be opposite one another.

DECORATING THE VESSEL

Conceptual Modes	Procedural Modes
1. Designs can be formed of single-line incising.	1. Sharp edge of flat-sided tool drawn over clay at oblique angle.
2. Designs can be formed by stab-and-drag incising.	2. Flat side of tool held against clay surface and point of tool pushed forward and into clay at about 10-degree angle. Then tool pulled back and flat side dragged over clay surface.
3. Designs can be formed by single-line cord impressing.	3. A single cord repeatedly pressed down into pliable clay.
4. Designs can be formed by punctating.	4. End of stick or dowel pressed into clay then withdrawn.
5. Designs can be formed by finger impressing.	5. Tip of finger pressed into clay at acute angle then withdrawn.
6. Designs can be formed by fingernail impressing.	6. Finger pressed to clay at oblique angle leaving only fingernail impression.
7. Rim can have a wavy appearance.	7. Rim bent slightly inward, then outward and process repeated about rim circumference.
8. Neck surface can be brushed.	8. Bundle of small sticks or coarse grass drawn over neck surface.
9. A single area can be decorated.	9. Designs applied to neck alone, lip alone, or rim interior alone.
10. A double area can be decorated.	10. Designs applied to neck and rim exterior, neck and lip, neck and rim interior, rim exterior and lip, rim exterior and rim interior, or lip and rim interior.
11. Three areas can be decorated.	11. Designs applied to neck exterior and lip; neck exterior, rim exterior and rim interior; or rim exterior, lip and rim interior.
12. Designs can have a rectilinear appearance.	
13. Designs can have a curvilinear appearance.	

Rules of Combination:

1. Designs in any single technique or combination of techniques not exceeding three may be applied to a single area.
2. Designs in any single technique or combination of techniques not exceeding three at a single locus or four on the whole vessel may be applied to any combination of two areas.
3. Designs using any single technique or combination of techniques not exceeding three at a single locus or four on the whole may be applied to any combination of three areas.
4. Designs should be composed of sets of straight, parallel lines which if brought into opposition will meet at an angle approximately 45 or 90 degrees but will not intersect.
5. Designs can be composed of sets of curved parallel lines.

DRYING THE VESSEL

Conceptual Modes	Procedural Modes
1. We cannot approximate the standards used to judge sufficient drying but from an analysis of material they were efficient.	1. Pottery vessel placed in artisan's lodge away from jarring and drafts, until judged sufficiently dry.

FIRING THE VESSEL

Conceptual Modes	Procedural Modes
1. We cannot approximate standards and concepts which guided the firing process.	1. Pottery vessel placed in fire until sufficiently hard.